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FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE

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BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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J. R. SCHRAMM, Editor-in-Chief

FREDERICK V. RAND, Associate Editor-in-Chief

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Vol. 14

JANUARY, 1925

No. 1

ENTRIES 1-1025

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 165, 167, 171, 172, 173, 209, 294, 302, 306, 314, 319, 331, 340, 341, 619, 694, 895, 959)

1. ANONYMOUS. A novel use for sugar-cane waste. *Sci. Amer.* 129: 241. 2 fig. 1923.—In Hawaii a "mulch paper" is made from the bagasse, which is laid in strips over the rows of young cane. As the cane grows, its tips penetrate the paper, but the weeds, being unable to do so, are eliminated.—*Chas. H. Otis.*

2. ANONYMOUS. Hickory King maize contest. *Agric. Gaz. New South Wales* 35: 596. 1924.—Requirements and rules are given for this forthcoming contest.—*L. R. Waldron.*

3. ANONYMOUS. The Fulton double crusher. *South African Sugar Jour.* 8: 403. 1924.—The double crusher is described, and statistics on grinding from a Cuban mill which in 1918 converted its single crusher into a double crusher are given to show the advantages of the double over the single crusher.—*Nellie E. Fealy.*

4. ADAMS, A. B. Pastures in the South-west. *Jour. Dept. Agric. Western Australia*, 2nd Ser. 1: 30-33. 1924.—Grass mixtures are recommended for 3 soil types as follows: (1) Drier soils—mixtures, in the order of preference are, subteranean clover and cluster clover, giblets grass and Boyd's clover, couch grass and Wallaby grass; (2) Wet swamps—water couch, greater birdsfoot trefoil and strawberry clover, reversed or drooping—flowered clover; (3) Soils between (1) and (2) as regards moisture content—*Paspalum dilatatum* and kikuyu, creeping bent grass, white Dutch clover. Clovers and grasses named under (1) and (2) are available in proportion to the inclination toward wetness or dryness of this soil type.—*P. J. Olson.*

5. AGELASTO, A. M., C. B. DOYLE, G. S. MELOY, AND O. C. STONE. The cotton situation. *U. S. A. Dept. Agric. Yearbook* 1921: 322-406. 53 fig. 1922.—Production and marketing problems are discussed as to controlling factors, methods and costs.—*C. J. Shirk.*

6. BAKER, O. E. A graphic summary of American agriculture. *U. S. A. Dept. Agric. Yearbook* 1921: 407-506. 124 fig. 1922.—This is a series of maps, charts, and graphs visualizing the agricultural regions and the factors determining them, the distribution of 50 crops and questions concerning the farm as a whole such as size, values, expenditures, tenancy, and improvements.—*C. J. Shirk.*

7. BAKER, O. E. The agriculture of the Great Plains region. Ann. Assoc. American Geographers 13: 109-167. 1923.—The boundaries of the Great Plains region in their relation to agriculture are defined largely by physical factors. The region is divided into 4 belts running north and south, namely by the Sub-humid Black-Earth Belt, the Semi-arid Farming and Grazing Belt, the Semi-arid Grazing and Forage Crop Belt and the Arid Grazing Area. The boundaries of each of these are discussed both by physical and biological criteria. There are also belts running east and west. Beginning at the north these are the Spring Wheat Belt, the Corn Belt, the Corn and Winter Wheat Belt and the Cotton Belt. The eastern boundary or transition zone of the whole region is marked (1) by lime accumulation in the subsoil accompanied by a change in color from black to dark brown and (2) by alfalfa and wild hay giving way to timothy and clover; corn becomes much more grown and wheat less important. The western limits of the region are marked by the foothills of the Rocky Mountains except in the Southwest where they cease at the so-called Desert Lands. The agriculture of each of the belts is discussed in detail both in its agronomic and economic aspects. Based on all the data presented the author considers the agricultural outlook. The principal products of the region as a whole are wheat and cattle and the outlook for these 2 commodities in the immediate future is not reassuring. The normal trend of increasing population will not only lead to more intensive use of the land, but will largely do away with the problems as they now exist. At this time "The Great Plains region presents the most pressing problems in American agriculture, and deserves all the help which national and state agencies for the promotion of agriculture can offer."—C. V. Piper.

8. BALL, C. R., C. E. LEIGHTY, O. C. STINE, AND O. E. BAKER. Wheat production and marketing. U. S. A. Dept. Agric. Yearbook 1921: 66-160. 71 fig. 1922.—The importance, historical development, costs, and financing of wheat production for 1921 are presented. In marketing, the discussion centered about classification and quality of wheat, costs of transportation, and market prices for 1921 and the outlook for the future. All phases of the discussion are well illustrated by maps, diagrams, charts, and graphs.—C. J. Shirk.

9. BARTLETT, H. Fallow competitions, 1923-24. Parkes, Forbes, and Coradgery. Agric. Gaz. New South Wales 35: 469-478. 1924.—Detailed data are given upon various competitions, with notes in regard to resultant cropping. Awards were made upon the following points: moisture, mulch, weeds, consolidation, and cultivation, each item having equal weight.—L. R. Waldron.

10. BARTLETT, H. Farmers' experiment plots. Maize experiments 1923-24. Agric. Gaz. New South Wales 35: 403. 1924.—Due to extremely dry conditions all yields were very low and results can not be considered comparable. The highest yield, 12 bushels per acre, was from crossbred Yanco.—L. R. Waldron.

11. BARTLETT, H. Farmers' experiment plots. Wheat and oat experiments, 1923. Agric. Gaz. New South Wales 35: 389-392. 1924.—Cooperative experiments were carried out with 17 varieties of wheat and 5 of oats, on 10 private farms. The yields generally were low.—L. R. Waldron.

12. BLAKELY, W. F. [*Cenchrus pauciflorus* Benth.] Proc. Linnean Soc. New South Wales 47: xxii. 1922.—At the April 26, 1922, meeting of the Society, specimens of this North American sandbur which had been received by the National Herbarium for the 1st time from 3 widely different localities during the past 4 months, were exhibited. It was alleged that in 2 cases they had been introduced in "Sudan Grass" seed.—Eloise Gerry.

13. BLAKELY, W. F. [Exhibit from National Herbarium of new weeds of New South Wales.] Proc. Linnean Soc. New South Wales 47: xxxi. 1922.—The following specimens were exhibited at the November 29, 1922, meeting of the Society: (1) *Silene quinque vulnere* L., (not new for state); (2) *Cleome spinosa* Jacq. (South America); (3) *Chamaesyce prostrata* (Ait.) Small (*Euphorbia prostrata* Ait.) (North America) found for the 1st time on Jaluit, Marshall Islands; Nauru and Ocean Islands; Upolu, Samoa; (4) *C. thymifolia* L. (*E. thymifolia* L.); (5) *C. Preslii* (Guss.) Arth. (*E. Preslii* Guss.) ("slobber weed" North America); (6) *Datura ferox* L. (Spain, said to possess similar properties to *D. stramonium*; (7) *Martynia diandra* Glox. (Tropical America); (8) *Cnicus benedictus* L. (Asia) (leaves and flowering tops used in "bitter tonics" in America).—Eloise Gerry.

14. BLAKELY, W. F. Weeds of New South Wales. Agric. Gaz. New South Wales 35: 419-421. 1 fig. 1924.—Russian knapweed (*Centaurea picris* Pall.) is described and suggestions are given for its control and eradication. This plant was observed first in New South Wales in 1920. So far it has been found mainly in fields of alfalfa.—L. R. Waldron.

15. BRITISH EMPIRE EXHIBITION. Malayan agriculture handbook compiled by the Department of Agriculture F. M. S. and S. S. ii + 301 + iv p., 11 pl. Fraser & Neave, Ltd.: Singapore, 1924.—This 2nd edition is intended to draw attention to the various products displayed in the Agriculture Section of the Malaya Pavilion at the British Empire Exhibition, to illustrate the possibilities of new crops, to describe as concisely as possible the best methods of cultivation, harvesting and preparation of these products for the market, and to indicate their market values.—The main subjects discussed are: general cultivation, rubber, cereals, fruits and vegetables, oils and fats, fibres, paper, miscellaneous crops, plant diseases and insect pests, peat, cattle and poultry.—Frederick V. Rand.

16. BROWN, B. A., AND W. L. SLATE, JR. Alfalfa in Connecticut. Storrs [Connecticut] Agric. Exp. Sta. Bull. 115. P. 300-323. 1923.—Twenty-five strains of alfalfa, have been compared during 5 years. Grimm has been found superior to northern grown common which has been superior to Turkestan. Kansas grown common has been found to lack hardiness and to be less desirable than northern grown common. Peruvian and Arabian are not suited to these conditions. For short rotations northern grown common is satisfactory unless the winter is especially severe.—During this 5-year period, soil treatments with fertilizers and lime have been made. There was a response to large lime applications, although no attempt was made to grow alfalfa without lime. Manure produced good crops at a large cost and encouraged the grasses and weeds. Acid phosphate with manure gave no increase. Muriate of potash alone or with acid phosphate has reduced winter killing and increased yields. Complete fertilizer has given a large yield but it has been expensive.—Late summer seedings have winter-killed 4 out of 7 times. A mixture of grasses has insured a hay crop, but the grass crowds out the alfalfa. Fair stands of alfalfa were obtained by seeding with early maturing oats or with barley. Late maturing oats were unsatisfactory. Ten pounds of seed drilled in, gave nearly as good stands as 18 pounds sown broadcast.—Henry Dorsey.

17. BROWN, W. H. Wheat-growing at West Wyalong. Modern methods in practice. Agric. Gaz. New South Wales 35: 393-402. 4 fig. 1924.—This article deals largely with methods of preparation for the crop. The variety, Yandilla King, has shown best yields.—L. R. Waldron.

18. CARNE, W. M. Buy good seed. Jour. Dept. Agric. Western Australia, 2nd Ser. 1: 70-73. 1924.—The provisions of the "Agricultural Seeds Act" are explained. A table is presented showing the germination and purity to be expected of common farm and garden seeds listed. A list of noxious weed seed, the sale of which is prohibited, is also given.—P. J. Olson.

19. CHARLTON, J. Annual report of the Agricultural Chemist. Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist. etc. 1921: 64-65. 1923.—In addition to routine analyses, work was done on "the mitigation of nuisances caused by the parboiling of paddy" [rice], and on the prussic acid content of Burma beans (*Phaseolus lunatus*).—Winfield Dudgeon.

20. CHATAWAY, T. D. The Australian sugar industry. Interesting results of a dry year. Internat. Sugar Jour. 26: 298-302. 1924.—Queensland sugar-cane area is divided into (1) Rockingham, which includes everything north of Townsville; (2) Edgecumbe, from Townsville to Mackay; (3) Wide Bay, from the Tropic of Capricorn south to about 26°; and (4) a region about Brisbane called Moreton. The northern rivers of New South Wales and the beet-sugar industry of Victoria complete the Australian sugar output. Tables are given showing the acreage and production for the 4 divisions, the cane production in New South Wales and the beet production in Victoria for 1923 and 1922. A table shows annual average rainfall and rainfall during 1923 at various places in the 4 divisions, production of sugar and cane in each division in 1922 and 1923, and notes on the effect of rainfall on quantity and quality of cane and on the effect of removal of timber on rainfall. Operation of a Government-owned factory is briefly described. In discussing the question of cane and beet by-products the writer emphasizes the future possibilities from the manufacture of motor spirit from molasses. Each ton

of molasses represents 65 gallons of alcohol and at present the greater part of 50,000 tons of molasses is wasted in a good season. The saving of this would mean an additional income of about £400,000 a year, besides field economies mentioned. The successful manufacture of Coletax in Louisiana is discussed. The Government has established 3 scholarships for the sugar industry, 1 for sugar engineering and chemistry, 1 for plant pathology, and 1 for soil problems. Each has a value of £300 a year and is tenable for 4 years. Each holder is to spend his 1st year studying his subject in Queensland and the remainder of the period at such place abroad as the Minister of Agriculture may decide. Each is required to sign an agreement to enter the employment of the Queensland Government for 4 years at the expiration of his term, with remuneration at not less than £300 a year. The Council of the Australian Producers' Association has established a 4th scholarship at the Association's expense.—*Nellie E. Fealy*.

21. CHIEL, THE. Umfolzi notes and news. Cooperative Sugar Planters Ltd.—First annual meeting. Chairman's and directors' reports—An optimistic outlook. South African Sugar. Jour. 8: 425. 1924.—Under this company's new system in the sugar industry, the payment for the cane is based on its actual sugar content. The company's cane technologist sees that the cane reaches the mill during its period of greatest value, which necessitates constant analysis of all cane growing in the settlement and the keeping of accurate records of rise and fall of sucrose, purity, etc., on every field of each farm. The system for individual analysis is briefly described. It is believed the system of payment by individual analysis will soon become automatic.—*Nellie E. Fealy*.

22. [CLAGUE.] Report on the Hopin Agricultural Station. Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist, etc. 1921: 37-43. 1923.—Tests were made of rice, jute, and sugarcane varieties. Soil treatment and crop rotation experiments were carried on during the year.—*Winfield Dudgeon*.

23. [CLAGUE.] Report on the Mandalay Agricultural Station. Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist, etc. 1921: 1-16. 1923.—The report describes manurial and nursery experiments with rice, experiments to determine the best time and method for transplanting and the best time for watering rice, and the optimum amount of water to be used. Trials with various fodder crops are also discussed.—*Winfield Dudgeon*.

24. [CLAGUE.] Report on the Tatkon Agricultural Station. Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist, etc. 1921: 17-25. 1923.—Details are given of cotton and sugarcane variety tests, and of tests with *Sesamum indicum* as to varieties and methods of cultivation.—*Winfield Dudgeon*.

25. [CLAGUE.] Report on the Yawngnwe Agricultural Station. Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist, etc. 1921: 26-36. 1923.—The following work was carried on during the year: Bone meal fertilizer, liming, and green-manuring experiments; tests of methods of cultivation for potatoes and sugarcane; selection, variety tests, and methods of cultivation for wheat; variety tests with *Arachis hypogaea* and *Phaseolus vulgaris*; and multiplication of selected rice for seed distribution.—*Winfield Dudgeon*.

26. CLAYTON, E. S. Summer fodder trials on the southern districts. Agric. Gaz. New South Wales 35: 554. 1924.—Cooperative trials were conducted upon 2 private farms. The crops grown were sorghums, millets, Sudan grass, and 1 variety of maize. The different varieties of sorghum gave the better results.—*L. R. Waldron*.

27. CLOUSTON, D., AND W. H. HARRISON. Report of the Director. Sci. Rept. Agric. Res. Inst. Pusa 1922-23: 1-9. 1923.—The report briefly reviews the activities of the Institute, especially the work of the botanical, chemical, animal nutrition, bacteriological, mycological, entomological, and agricultural sections, and of the Imperial Dairy Expert and the Sugar Bureau. Arrangements have been made to begin graduate instruction on a limited scale.—*Winfield Dudgeon*.

28. DAVIS, B. M. Root development of lucerne. New Zealand Jour. Agric. 28: 179-180. 1924.—A report on a study of root development as affected by fertilizer and moisture is given.—*N. J. Giddings*.

29. DEEM, J. W. Spontaneous combustion of hay. New Zealand Jour. Agric. 28: 265-267. 1924.—A stack of hay took fire from spontaneous combustion 40 days after stacking. It was under observation and was being opened when the flames first started.—*N. J. Giddings*.

30. DÖRFLER, HANS. *Düngerfibel*. [Fertilizer primer.] 61 p. F. P. Datterer & Cie.: Freising-München, 1923.—The various forms of natural and artificial fertilizers and their application to different crops are described and discussed briefly and in every day language, with a view to furnishing a guide for the practical farmer.—*P. R. Dawson*.

31. DOWNING, R. G. Ploughing v. cultivation after maize in New England. *Agric. Gaz. New South Wales* 35: 388. 1924.—It was found that a slight advantage resulted over a number of years, in cultivating maize stubble instead of reploting.—*L. R. Waldron*.

32. DUNSHEE, D. F., AND J. W. JONES. Results of rice experiments at Cortena, 1923, and progress in experiments in watergrass control at the Biggs rice field station 1922-23. *California Agric. Exp. Sta. Bull.* 375. 1-38. 1924.—Rice sown broadcast and immediately and continuously submerged, or rice sown broadcast in the water and kept submerged thereafter, appears to have 3 distinct advantages over rice irrigated in the old way: (1) It matures from 7 to 10 days earlier than rice irrigated in the old way, depending somewhat upon the date of seeding, for there is less difference from early than from late dates of seeding; (2) continuous submergence does control the most common forms of water grass and sprangle-top; (3) the rice appears to develop into better plants than those grown by the old method of irrigation. When rice is drilled and immediately submerged it appears that much of the seed rots, and this often results in poor stands and low yields of rice. When rice is drilled or broadcast and irrigated lightly for 2-4 weeks to bring it up before it is permanently submerged, shallow submergence at 2 and 4 inches apparently does not control the water grass. Deep submergence at 6 and 8 inches does aid in control of water grass, but such depths also suffocate so much rice that low yields are produced. The results indicate that good seedbed preparation pays. It does not pay to grow rice on a seedbed prepared merely by disking stubble land, because such weeds as spike-rush, slender aster, cat-tail, canary grass and perennial sedge reduce the yields below profitable limits. Good spring plowing aids materially in the control of these weeds. The results indicate that rice should be sown at a higher rate when it is grown by continuous submergence immediately after broadcasting than when it is grown by the old method of irrigation. The results also indicate that on land foul with cat-tail a heavy rate of seeding (200 pounds per acre) does not help to control the cat tail, but good stands of rice apparently do aid in preventing cat-tail from entering a clean rice field. It appears that less seed is required to obtain good stands when rice is sown broadcast in the water than when sown broadcast on the soil and then submerged. This probably is due to the fact that when sown broadcast and then submerged much seed is covered by slacked clods and rots before germination. On old land, rice probably should be sown at the rate of 150 pounds per acre when grown by the old method of irrigation.—*A. R. C. Haas*.

33. ELAZARI, M. Preliminary report on the agricultural aspects of a sugar industry in Palestine. *Zionist Organization Inst. Agric. Nat. Hist. Agric. Exp. Sta. Bull.* [Palestine] 3. 108 p. Pl. 1-8. 1924.—Palestine uses 7800 tons of sugar per year, the per capita consumption being 60 kg. per year in Australia, 46 in England, 44 in the U. S. A., 10 in Palestine, and 6 in Italy. The report contains (1) a general survey of sugarcane culture in Palestine, (2) experiments and results, (3) comparisons with other countries, and (4) conclusions. The history of its culture in the Near East is traced, beginning with the 6th century B. C., in India. The yield varies from 50-70 tons per hectare, the largest area being at Saron with 6000 sq. m. (1½ acres). A full record of the temperature at the Sea of Galilee is tabulated. The time of planting is in winter. The combination of beet and cane is considered advisable.—*John E. Dinsmore*.

34. FARNELL, R. G. W. Scientific research in connection with the sugar industry. *Internat. Sugar Jour.* 26: 303-307. 1924.—A brief historic sketch shows very meager advances made in the manufacture of raw sugar during the last half century. The good and poor points of Uba cane and the fact that a systematic investigation of the exact character of its juice has never been made are cited to show the necessity of morphological studies to settle the taxonomic description of sugar-cane varieties. An account is given of recent developments of State-aided research in England and its effect on industry in general and on the sugar industry in particular. The writer suggests an organization for the Research Association for the British sugar industry, which embraces (1) an experiment station in the tropics or subtropics,

(2) a small model factory in connection with the station, and (3) a laboratory in England associated with a records office and an intelligence bureau. The work to be done by each is indicated. What has been done for the benefit of the sugar industry by stations in several countries is sketched to show the possibilities of the Sugar Research Association.—*Nellie E. Fealy*.

35. FOY, NELSON R. Clover seeds. *New Zealand Jour. Agric.* 28: 11–21. 21 fig. 1924.—The seed of 11 species of clover are described and pictured. *Trifolium repens*, *T. incarnatum*, *T. subterraneum*, *T. fragiferum*, and *T. alexandrinum* are considered of greatest economic importance in New Zealand. *Trifolium dubium*, *T. glomeratum*, *T. arvense*, and *T. procumbens* are listed as sub-economic species.—*N. J. Giddings*.

36. FOY, NELSON R. The official seed-testing station. *New Zealand Jour. Agric.* 28: 392–399. 1924.—This is a report of analyses made during 1923–1924.—*N. J. Giddings*.

37. FROBBERVILLE, L. F., DE. Deterioration of Uba cane between cutting and crushing. Valuable scientific experiment of great importance to the industry. *South African Sugar Jour.* 8: 349, 351, 353, 355, 357, 359, 361, 363, 365, 367. 1924.—The main questions investigated were loss of weight between cutting and crushing, decrease in richness of the cane, diminution in quotient of purity of juice, and increase in glucose quotient. The experiments were made so as to cover the usual mode of working with both trashed and burnt cane. The procedure is outlined and the results are given in tabular form. It was found that under all circumstances burnt cane loses more in weight than trashed cane.—*Nellie E. Fealy*.

38. GREEN, L. J., AND A. N. SHEPHERD. Field experiments with rice. *Agric. Gaz. New South Wales* 35: 555–564. 6 fig. 1924.—The crop was grown at Coonamble and at Yanco, using the California method. The general outlook for rice cultivation is good as far as soil and climate are concerned. The main limiting factor will be the lack of sufficient artesian water. The crop will require more than the wheat crop to prevent excessive weed growth.—*L. R. Waldron*.

39. HEIDE, F. F. R. Bloembologische onderzoekingen betreffende sawahrijst. [Study of flowering in irrigated rice.] With English summary. Mededeel. Alg. Proefsta. Landb. Dept. Landb. Nijv. en Handel (Dutch East Indies) 15: 1–49. 2 pl. 1923.—Some rice varieties are open to cross-pollination, some are cleistogamous, and some are capable of either behavior, depending on climatic conditions. Most of the varieties in the Dutch East Indies appear to fall in the last-named group—self-pollinated in dry, sunny weather, and cross-pollinated in wet weather. In open pollination, the periphery of the fructification succeeds considerably better than the interior. With closed pollination the difference is less marked. Aside from the loss by parasites, about $\frac{1}{4}$ of the spike fails to set, the lower 3rd being worse than the rest of the spike in almost all varieties. Observations in Java and Padang highlands of Sumatra show that failure of flowers to set is more often due to external conditions affecting nutrition than to insufficient fecundation. *Padi angsa*, an early ripening variety, has open pollination, hybridises readily and probably on that account is no longer planted. It occurs scattering in plantings as a weed, and its yield is low because its early flowering reduces its chances of cross-pollination. Otherwise it is a normal variety.—*Carl Hartley*.

40. HENDRY, D. Report on the Hmawbi Agricultural Station. Dept. Agric., Burma, Ann. Repts. Agric. Stations. Agric. Chemist, etc. 1921: 50–57. 1923.—The purpose of the Hmawbi Station is for experimental work on rice. The report gives an account of manurial experiments on permanent plots; soluble and bone phosphate tests; manuring of nurseries; and various experiments in methods of cultivation for rice and plantains.—*Winfield Dudgeon*.

41. HOWARD, A., AND G. L. C. HOWARD. Report of the Imperial Economic Botanists. Sci. Rept. Agric. Res. Inst. Pusa 1922–23: 10–22. 1923.—Cultivation of improved strains of wheat developed at Pusa is steadily extending throughout India. More than 1,000,000 acres are under these improved wheats in the United Provinces and the Punjab alone, and “the annual increased profit to the growers can be placed at 15 rupees an acre.” Details of the distribution of various improved seeds during the year, and for the last 13 years are, given.—The decided lowering of soil permeability that takes place after July (in India, during the monsoon) is considered to be due to the formation of colloids in the soil. That the effect of small dressings of superphosphate late in the monsoon may be due to the action of this weak acid on the

colloids is borne out by experiment. Dilute H_2SO_4 , and S (readily oxidized in the soil) gave better results than superphosphate on cotton plants, which are very sensitive to poor soil aeration.—Other lines of investigation are: The effect of grass on trees; root development in maize and *Andropogon sorghum*; the effect of nitrogenous manures on leguminous crops; conditions necessary for seed formation in lucerne and other leguminous fodder crops; and the effect on man of long continued consumption of seed of *Lathyrus sativus*.—Winfield Dudgeon.

42. KERLE, W. D., AND E. S. CLAYTON. **Fallowing competitions, 1923-24.** Agric. Gaz. New South Wales 35: 381-387. 1924.—Detailed data are given upon the various competitions, with notes in regard to resultant cropping. Certain conclusions are drawn, among which are those of the desirability of earlier fallowing, more frequent harrowing, and more shallow plowing and cultivating, with, in many cases, an earlier killing of weeds.—L. R. Waldron.

43. KONDO, M. **Beiträge zur Kenntnis der Keimungs-physiologie der Reissaatkörner (*Oryza sativa*), des Wachstums ihrer Keimpflanzen und der Beschaffenheit des Reissaatbietet.** [The physiology of germination of the rice seed (*Oryza sativa*), the growth of the seedling and the condition of the seed bed.] Ber. Ohara Inst. Landw. Forsch. 2: 291-359. 1923.—Rice seed are commonly soaked in water before planting, for the purpose of hastening germination and to prevent loss from floating. The length of time best suited for soaking the seed depends upon the temperature. Seed collected when full-ripe germinate best and their seedlings grow well. Seed harvested in the milk stage germinate poorly and their seedlings are weak. The yellow-ripe and dead-ripe seed germinate and grow well, but are inferior to those harvested when full-ripe. The depth of water on the seed bed should be regulated with respect to air and soil temperatures. In cold situations a greater depth of water is required than in warm locations. The blades of the young rice plants are long and thin if they are covered with water, but are shorter and thicker if the soil is merely saturated. On the contrary the roots grow slowly and remain relatively short if covered with water. In the vicinity of the seacoast where the soil is often alkaline the seed beds should be well covered with water.—H. S. Reed.

44. LEIGHTY, C. E., C. W. WARBURTON, O. C. STINE, AND O. E. BAKER. **The corn crop.** U. S. A. Dept. Agric. Yearbook 1921: 161-226. 57 fig. 1922.—The aspects of production and marketing are presented. The importance, history, and costs of production are discussed. In marketing, the subjects considered are grading, quality, costs and markets. All discussion pertains to 1921.—C. J. Shirk.

45. LOWE, G. N. **Cultivation of the potato.** Jour. Dept. Agric. Western Australia 2nd Ser. 1: 81-82. 1924.—This is a brief popular discussion of the selection of soil and situation, and handling and preparation of soil for the potato.—P. J. Olson.

46. McCALL, A. G. **Lime and fertilizer requirements for annual legumes.** Rept. Maryland Agric. Soc. 7: 276-281. 1922 [1923].—The author directs attention to the following facts: (1) Crimson clover, cowpeas and soybeans are the annual legumes for Maryland. (2) Crimson clover is best adapted to conditions in the East-Shore area and many sections of Southern Maryland—lime being a necessary material for its best growth. (3) Cowpeas thrive under more adverse conditions than do soybeans, and are less sensitive to soil acidity. (4) Though soybeans are less sensitive to soil acidity than either alfalfa or medium red clover, they require the presence of available lime for their best development—giving increases of 0.58 ton and 0.85 ton per acre, respectively, on 2 Maryland farms where liming tests were made in 1921. (5) Soybeans fill a useful place in the rotation system in grain farming by aiding in the maintenance of soil productivity, as has been demonstrated in a 12-year experiment in Ohio, where it has been shown, in comparison with livestock farming, that the growing of soybeans in grain farming must be supplemented with the use of some commercial fertilizer in order to equal the productivity of livestock farming. (6) The following rotation for grain farming promises much for Maryland conditions: Wheat, 1 year; mixed hay, 1-2 years; corn, 1 year; soybeans 1 year.—James R. Weir.

47. McKERRAL, A. **Report on the Padu Agricultural Station.** Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist, etc. 1921: 45-49. 1923.—Padu is a gram (*Cicer arietinum*) and wheat station. Work on cotton and gram selection, and on crop rotation experiments are reported.—Winfield Dudgeon.

48. OPITZ. Über die Beurteilung anzuerkennenden Saatgutes. [Judging seedstocks offered for certification.] Mitteil. Deutsch. Landw. Ges. 39: 86-87. 1924.—The author discusses certain points regarding procedure, purity tests and other details concerning seed certification in general.—*A. J. Pieters.*

49. PAGE, H. J. The soybean: a crop of the future. [Rev. of: PIPER, C. V., AND W. J. MORSE. The soybean. xv + 329 p. McGraw-Hill Book Co.: New York and London, 1923 (see Bot. Absts. 12, Entry 3707).] Nature 113: 813-815. 1924.

50. PECK, F. C. The cost of a bushel of wheat. U. S. A. Dept. Agric. Yearbook 1920: 301-309. 1921.—A discussion of the varied range and the principal items of costs is given. In order to promote an adequate production, the cost that is representative of the bulk of the production must be ascertained instead of the marginal costs.—*C. J. Shirk.*

51. PELLET, H. The deterioration of cut cane. South African Sugar Jour. 8: 336-5-336-7. 1924.—In experiments made in Barbados to determine this question, a large number of canes were cut and divided into 3 lots, 1 lot being exposed in the open, the 2nd covered with trash and left in the open, and the 3rd covered with trash and sprinkled with water daily. The results were variable. The 1st lot altered most rapidly and the 3rd was least affected. Simultaneously with deterioration, reducing sugars increased and weights decreased. Results from another source showed that loss of weight varies with size of cane, density of heap, temperature of atmosphere, and force of wind. In straight canes the loss in weight is least. The loss in weight is not always in proportion to degree of deterioration. Deterioration of canes preserved under the same conditions varies much with variety used. Freezing of the canes increases deterioration. The procedure for recognizing frozen canes is outlined. In determining the best cane for any district its keeping qualities should be known as well as its sucrose content and purity of juice. Examinations for determining keeping qualities should be made at different intervals during the working period and average samples obtained by analyses of a large number of lots.—*Nellie E. Fealy.*

52. PIPER, CHARLES V. Forage plants and their culture. Rev. ed. 671 p. 14 pl. 74 fig. The Macmillan Company: New York, 1924.—This revised and enlarged edition covers the general field of the 1st edition, adding information regarding new forage plants and adjusting the importance of various grasses and legumes in the light of recent performances. Results of the more important recent experimental work at Arlington Experimental Farm and the state experiment stations are given, the statistical data are revised, based upon the figures of the 1920 Census, and numerous outline maps showing the distribution of the various forage crops and diagrams illustrating the statistical information, have been added. The chapter on pasture has been rewritten and the new chapter, Pastures and pasturages, discusses the subject in its various phases. Chapters conclude with reference lists, and illustrations of plants and farming operations are included. The main purpose of the book is as a text for agricultural colleges.—*Mary Burr.*

53. PRIDHAM, J. T. Purity of seed oats. Agric. Gaz. New South Wales 35: 479-480. 1924.—Suggestions are made relative to methods of keeping seed oats pure. Attention is called to the danger of allowing strains of false wild oats to increase in cultivated oat varieties.—*L. R. Waldron.*

54. PRIDHAM, J. T. The origin of Bena wheat. Agric. Gaz. New South Wales 35: 404-405. 1 fig. 1924.—This wheat was found in a plot of Hard Federation and probably is a cross between that variety and Marshall's No. 3. It is less liable to rust and is later than the variety Hard Federation. It has given promising yields.—*L. R. Waldron.*

55. Q., H. Cairns view of the burnt cane problem. Australian Sugar Jour. 16: 84-85. 1924.—Recommendations made by the Cairns Cane Growers Association for dealing with the burnt-cane problem are: (1) Clean and wide headlands, and clean railway and tramway tracks; (2) care and discretion in the engagement of cutters; (3) insurance against fire; (4) heavier deduction from cutters of burnt cane and also from the farmers, the deductions to be distributed among cutters and growers of green cane; and (5) the quota of trucks to any farmer to remain the same whether the cane is green or burnt. The carrying out of the 3 measures 1st mentioned depends on the farmers, and the mill authorities have power to put the 4th and 5th, or penalty clauses, into effect.—*Nellie E. Fealy.*

56. RICHARDSON, A. E. V. **Field tests with sugar beet.** Jour. Dept. Agric. Victoria 18: 587-592. 1920.—The results of these tests show that for best results sugar beets should be sown (1) 18 inches apart, (2) early, (3) 14 pounds per acre, (4) should be thinned 4 weeks after planting, and (5) cultivated a maximum of 4 times. Locally bred acclimated seed gave better results than freshly imported seed. Uncultivated plots were a failure on account of the growth of weeds. "These weeds depressed the yield of the outer row of each of the plots adjacent to the non-cultivated plots."—*W. E. Lawrence.*

57. RUDAL, H. **Farm wheat crops competition.** Jour. Dept. Agric. Western Australia, 2nd Ser. 1: 55-61. 1924.—A wheat growing contest is described. Results are given in tabular form. The crop of each competitor is scored on the basis of yield per acre, freedom from weeds, freedom from disease, freedom from mixture, and evenness of growth. The method of handling the crop on the part of each of the winning contestants is described.—*P. J. Olson.*

58. SALAMAN, R. N. **A leaf index as a help to the identification of the potato varieties.** Proc. Cambridge Phil. Soc. Biol. Sci. 1: 121-131. Fig. 1-4. 1923.—The leaf index of a variety is ascertained from adult leaves on a healthy plant. The leaf index is a constant for each variety.—*Michael Levine.*

59. SAMPSON, ARTHUR W. **Native American forage plants.** xxv + 485 p., 119 fig. John Wiley & Sons, Inc.: New York, 1924.—This book, intended for the use of students and stockmen, is divided into 2 parts. Part I, "Plant Life of the Pasture," consists of 4 chapters in which are discussed the application of the principles of botany, the general structure and composition of pasture plants, the laws of plant physiology as related to grazing, the environment of native forage plants in relation to pasture management and the classification of forage plants. All of this is more or less the foundation work for that which is to follow. Part II, "Important Native Forage Plants," consists of 14 chapters beginning with a discussion of forage requirements of grazing animals and proceeding to the most important class of forage plants—namely, the grasses. The most valuable species of grasses are discussed separately and illustrated by individual plates; the distribution of these grasses is shown by maps based upon the collection in the United States National Herbarium. For the purpose of ready reference a comparative table of forage-value classification of important native pasture grasses is included. The discussion continues in the same form to the grass-like forage plants and then to the broad-leaved forage plants,—the plants of the pea and carrot families, plants of the sunflower, borage and honeysuckle families, plants of the buttercup, rose, willow, buckthorn, figwort, huckleberry and valerian families, plants of the goosefoot, beech, geranium, gooseberry, mallow, bunchflower, evening primrose and apple families. A forage-value classification is likewise given for the important genera of the broad-leaved plants. Lists of unpalatable broad-leaved plant genera conclude the work. Working toward common name standardization, the common names of species whose common names are not definitely established through usage have been so named, when feasible, to indicate the genus to which they belong. Their specific characteristics are also enumerated. The chapters conclude with a list of questions for the student and 2 rather complete bibliographies are included. Much of the information contained in this well illustrated volume is botanical in nature.—*Mary R. Burr.*

60. SAYER, WYNNE. **India's sugar production.** Australian Sugar Jour. 16: 83. 1924.—According to the report of the Secretary of the Sugar Bureau of India, tests of improved canes by the Bureau have shown that it is possible to increase the yield of cane in the white-sugar tract in North India by over 50%, and that these canes do equally well in years of short rainfall or heavy precipitation.—*Nellie E. Fealy.*

61. SAYER, WYNNE. **Report of the Imperial Agriculturist.** Sci. Rept. Agric. Res. Inst. Pusa 1922-1923: 76-98. 1 pl. 1923.—The report gives a summary of field experiments with fertilizers; an account of the general farming operations on the Pusa farm; comparative studies of steam plowing tackle and of motor tractors; and an account of the dairy herd for the year. A program of work for the year 1923-24 is added.—*Winfield Dudgeon.*

62. SAYER, WYNNE. **Report of the Secretary, Sugar Bureau.** Sci. Rept. Agric. Res. Inst. Pusa 1922-1923: 108-120. 1923.—Work is continued on the selection and distribution of promising varieties of cane; 3 especially heavy yielding varieties have given excellent results in actual

mill tests. Experiments on the manuring of sugarcane have been started. The Bureau keeps the Indian mills in touch with world markets and offers technical advice to those who need it.—*Winfield Dudgeon*.

63. SESCOUS. Ein Beitrag zum Anerkennungs-wesen. [The conducting of seed certification.] *Mittel. Deutsch. Landw. Ges.* 39: 523-525. 1924.—This is a statement of the requirements for seed certification and of methods of carrying on the work.—*A. J. Pieters*.

64. SHEPHERD, A. N. Farmers' experiment plots. Potato experiments, 1923-24. *Agric. Gaz. New South Wales* 35: 486-488. 1924.—These experiments were carried out cooperatively upon 4 private farms. The maximum yield was about 100 bushels per acre. Use of superphosphate increased the yield upon 1 farm.—*L. R. Waldron*.

65. SHEPHERD, A. N. Farmers' experiment plots. Summer green fodder trials, 1923-24. *Agric. Gaz. New South Wales* 35: 539-543. 1924.—Experiments were conducted on 7 private farms. The crops grown consisted of sorghum and maize. The maize variety, Fitzroy, gave the best returns of the group, while with the sorghums the locally named variety, Saccaline, stood 1st. Superphosphate trials were included.—*L. R. Waldron*.

66. SMITH, TEMPLE A. J. Curing yellow tobacco. *Jour. Dept. Agric. Victoria*. 18: 695-697. 1920.—Brief statements about tobacco varieties and soils are included.—*Wm. E. Lawrence*.

67. STOCK, T. D. Annual report of the Economic Botanist. Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist, etc. 1921: 62-63. 1923.—The author has worked on a genetical analysis of *Sesamum indicum*, of which 185 types have already been isolated, with a view to developing the oil content of the seeds; and on a survey of indigenous Burmese cottons and a study of their variations.—*Winfield Dudgeon*.

68. STOCK, T. D. Report of the Mahlaing Cotton Experimental Station. Dept. Agric., Burma, Ann. Repts. Agric. Stations, Agric. Chemist, etc. 1941: 58-61. 1923.—Mahlaing is an experiment station for cotton and other dry zone crops. Selection work on cotton is reported.—*Winfield Dudgeon*.

69. SPOKES, W. E. Report of Assistant Grass and Forage Crop Specialist. Florida Agric. Exp. Sta. Ann. Rept. 1922: 37R-41R. 1922.—Several species of grasses were tested in 1922 as to their suitability for lawns. *Eremochloa ophiuroides* appears very promising from the standpoints of color, fineness of leaves and absence of underground rootstalks. In sorghum tests, the later maturing saccharine sorghums yield more heavily than the earlier varieties. In Spanish peanuts the primary object was to develop a high-yielding strain, with secondary consideration to high or low oil content. Lespedeza gives good results in the permanent pastures of northern Florida. Subterranean clover (*Trifolium subterraneum*) S. P. I. 53914 sets its seed underground like the peanut. On low hammock it made an excellent spring growth from seed sown Nov. 25, 1921, without inoculation, maturing a heavy crop of seed May 25, 1922. On high pine land the crop was a complete failure. Hubam clover, *Melilotus alba annua*, on good hammock land, after inoculation, made good growth. On high pine land the growth was unsatisfactory, even when the seed were inoculated. The Mung bean, *Phaseolus aureus*, shows some promise as a summer legume, but does not seem to start off and make as high a yield on poor sandy soils as does the cowpea. Hairy vetch, *Vicia villosa*, made a fair growth where inoculated, but *V. angustifolia* and *V. sativa* were failures both on inoculated and uninoculated plots.—*J. C. Th. Uphof*.

70. SPOKES, W. E. Report of the Assistant Grass and Forage Crop Specialist. Florida Agric. Exp. Sta. Ann. Rept. 1923: 31R-45R. 1923.—The test of bush velvet beans, Mung beans, soybeans and cowpeas as hay crops showed that where planted on Norfolk sand of poor quality, these crops give but a slight yield of hay. The cowpea is the best yielder if a wilt- and nematode-resistant variety, such as Brabham or Iron, is planted. Unfertilized Napier grass as a silage crop gave 58% better results than the highest yielding, liberally fertilized sorghum, and 200% better than the highest yielding, liberally fertilized corn, tested for silage purposes. In the variety test of millets, brown top millet (*Panicum fasciculatum*) gave the highest yield of green feed and cured hay to the acre at the 1st cutting, as compared with pearl millet (*Pennisetum glaucum*) and German millet (*Setaria italica*). Results with the best sorghums (saccharine and non-saccharine) and Russian sunflower as forage, are given in

tabular form. The large, medium-to-late-maturing varieties of saccharine sorghums can be expected to give the best results for soiling and silage, whereas the smaller stemmed, early maturing varieties make more satisfactory hay plants in combinations with cowpeas. The bush velvet beans gave the lowest acre-yield of shelled beans (5.4 bushels), while Tiger, an early maturing medium vining variety, gave the highest yield (25.4 bushels). The question of yield of oats, either for winter grazing or grain, hinges largely on rust resistance. The Merker and Napier grass improvement work has brought out the fact that there is a great variability in the yielding power of individual plants grown from seed. The breeding work is being continued. Lime decreased both seed and vegetative yield of peanuts. Several pasture grasses were observed. Dallis grass (*Paspalum dilatatum*) and Vasey grass (*Paspalum laranagai*) look promising as pasture grasses on wet and heavy land. Hubam clover (*Medicago alba annua*) and subterranean clover (*Trifolium subterraneum*) again gave good results on heavier soils. Seradella holds some promise as a sandy land winter cover and green manure crop and forage plant. Trouble was experienced in getting the plants thoroughly inoculated.—J. C. Th. Uphof.

71. SUTTON, A. W. Do potatoes give rise to new and distinct varieties by bud variation [A paper read at the potato conference of the Board of Agriculture and Fisheries, Ormskirk, Oct. 31, 1918.] Bull. 9. Sutton and Sons: Reading, England, [no date].—The author 1st defines his conception of a distinct variety and implies that if such definition is applied to bud variations they cannot be regarded as distinct varieties. He willingly admits that "variations" rather than varieties do occur by bud-variation but that in all authenticated cases of this sort the modification consists in the absence or presence of a color factor in the skin of the tuber. Examples are cited in which the color factor disappeared as in the case of the White Beauty of Hebron from the Beauty of Hebron, White Fortyfold from Fortyfold, etc. The reported complete mutation of a variety as claimed a few years ago by Labergerie in the case of his violet Commersonii is cited as an example of a misleading assumption on the part of this gentleman that it actually was a bud-variation of the wild form of *Solanum commersonii* when in reality it was due to the accidental presence of a Blue Giant tuber in the soil where *S. commersonii* was planted.—W. Stuart.

72. SUTTON, GEO. L. An intensive lucerne plot. Jour. Dept. Agric. Western Australia, 2nd ser. 1: 33-35. Pl. 1. 1924.—A small plot of lucerne grown by A. C. R. Loring is described. Suggestions are offered as to amount of fertilizer (bone dust, phosphoric acid, superphosphate and sulphate of ammonia) to be applied in order to establish and maintain a field of lucerne.—P. J. Olson.

73. SUTTON, GEO. L. Experiments with wheat. Jour. Dept. Agric. Western Australia, 2nd Ser. 1: 61-69. 1924.—Results of several experiments are reported as follows: (1) Early and late seeding. Seeding about the middle of May resulted in higher yields than middle June or middle July seeding. (2) Rate of seeding. Rates of 30, 45 and 60 pounds were compared. Only slight differences were found. For hay purposes, a heavier seeding than 45 pounds seemed to have the advantage. (3) Rate of superphosphate application. Applications of 75, 150 and 225 pounds were compared. Heavier applications than 75 pounds were attended with profitable increases in yield at Chapman Experiment Farm (light soil) but not at Merredin (heavy soil). (4) Variety trials. Sixteen varieties were included in these trials. Yields, both as to hay and grain are given in tabular form.—A note is added regarding 2 experiments conducted by A. M. Richardson involving, respectively, the growing of "shandy" hay—wheat and oats intermixed, and a test of late and early sowing of wheat. Two mixtures of wheat and oats each surpassed wheat alone as regards resulting hay yields. Wheat sown April 21, 1922, surpassed in yield that sown June 2, 1922.—P. J. Olson.

74. TROWBRIDGE, P. F. Experiment station progress. Report of director, July 1921 to June 30, 1923. North Dakota Agric. Exp. Stat. Bull. 174. P. 5-16, 27-31, 74-99. 12 fig. 1924.—As an average for 4 years, wheat following clover has distinctly outyielded wheat following timothy or some other non-legume. Manuring a legume rotation has been of little, if any, benefit. On the Fargo clay, top-dressing of semi-permanent alfalfa fields with rotted manure has not been profitable, but manuring a permanent, slender brome grass sod has shown distinct benefit. Sunflowers, in 1921, following sweet clover yielded 2.75 tons air-dry fodder

per acre, which was less than the yields secured from Mercer flint corn. At Langdon, North Dakota, sunflowers, both drilled and checked, very greatly outyielded corn planted in a similar manner. At Fargo, in 1921, wheat yielded 13-20% more when grown after potatoes than after sunflowers. In 1922, early flint corns reached maximum ear yield on September 12. Flax is seeded with best results from April 20 to May 10. Flax in cultivated rows has, for 6 years, yielded essentially the same as flax sown thickly-spaced. Wheat following cultivated flax, the ground being disked and not plowed, has given satisfactory yields.—*L. R. Waldron*.

75. WALLACE, H. C. *The year in agriculture*. U. S. A. Dept. Agric. Yearbook 1921: 1-67. 20 fig. 1922.—A presentation of the adverse conditions affecting agriculture during the year and the result on industry and business are discussed.—*C. J. Shirk*.

76. WALLACE, H. C. *The year in agriculture*. U. S. A. Dept. Agric. Yearbook 1923: 1-93. Fig. 1-42. 1924.—This report of the Secretary of Agriculture to the President of the U. S. A., is concerned, among other things, with the following main subjects of interest to botanical science: Crops of the year, state of agriculture in general, the wheat situation, world demand for farm products, survey of world agriculture and markets, universal standards for American cotton, scientific research, insect enemies, plant diseases, the botanical forests, and land utilization policy.—*Frederick V. Rand*.

77. WALLACE, J. C. *Manuring of potatoes*. Ann. Rept. Kirton Agric. Inst. 1923: 10-30. 1 fig. 1924.—For the soils of this district (Holland County, Leicestershire, England), which are prevailingly silt loams, it was found that not more than 2½ hundredweight (cwt.) of $(\text{NH}_4)_2\text{SO}_4$ may profitably be applied for early potatoes, but an application of at least 1 cwt. of K_2SO_4 is profitable. For main-crop potatoes, an application of 3 cwt. of ammonia was profitable when used in connection with at least 2 cwt. of potash. Superphosphate was the most satisfactory source of phosphate, but not more than 2 to 3 cwt. per acre should be applied, otherwise maturity is too greatly hastened. The quantity of mixed fertilizer profitable to apply depended on the value of the produce and not directly on the yield; in general not more than 15 cwt. per acre can profitably be used. Potash fertilizer, particularly sulphate of potash, improved the cooking quality of potatoes.—*F. Weiss*.

78. WARNER, T. A. *Hulets Natal Planters' Association. Report of annual meeting*. South African Sugar Jour. 8: 336-8-337, 339, 343, 345, 347. 1924.—Continuous burning of cane quickly reacts on the fertility and general conditions of the soil. It costs about 2s. a ton more to trash cane than to burn it. Analysis showed that old cane, such as 3rd and 4th ratoons, have a high sucrose content but at the same time a very high fiber content. Its value to the mill is not as much as plant cane or 1st ratoons.—*Nellie E. Fealy*.

79. WATKINS, W. R. *Clarence River maize-growing contest*. Agric. Gaz. New South Wales 35: 411-412. 1924.—Sixteen farmers competed in this contest. Due to dry weather poor yields were secured, the maximum being 38 bushels per acre from the variety, Broad Leaming. It is suggested that in future contests the following scale should be used: type, 10; earliness, 20; yield, 70; total, 100.—*L. R. Waldron*.

80. WATKINS, W. R. *Farmers' experiment plots. Potato trials, 1923-24*. Agric. Gaz. New South Wales 35: 565-567. 1924.—Experiments were conducted upon 4 private farms. The maximum yield of 250 bushels per acre was secured from the variety, Early Manhattan. Green manuring gave an increased yield of over 30 bushels per acre.—*L. R. Waldron*.

81. WATT, R. D. *An agricultural objective for New South Wales*. Agric. Gaz. New South Wales 35: 457-467. 1924.—The objectives are to double the present area under crop and to increase the present yield per acre by 50%. In 1921, wheat occupied 72% of the cultivated area, hay 17%, with the remainder scattered. It is held that both objectives can be attained.—*L. R. Waldron*.

82. WENHOLZ, H. *Broom millet growing in New South Wales*. Agric. Gaz. New South Wales 35: 413-418. 2 fig. 1924.—This is a continuation of an article already abstracted. [See also Bot. Absts. 13, Entry 5680.]—*L. R. Waldron*.

83. WHITTET, J. N. *Molasses grass*. (*Melinis minutiflora* Beauv.) Agric. Gaz. New South Wales 35: 431-432. 1 fig. 1924.—This grass is not grown with much success in Australia and has not been able to contest the ground with *Paspalum dilatatum*. It is, therefore, of no

value in choking out scrub. The glandular secretion of the plant practically precludes its use as a desirable forage plant. It is propagated mainly by rooted cuttings or divisions of the main root system.—*L. R. Waldron.*

84. WILLIAMS, R. D. Depth of sowing grass and clover seeds. Jour. Ministry Agric. Great Britain 29: 53-60. 1922.—Experiments were carried out in pot, box and bed cultures to determine the effect of varying depths of sowing on red and white clover seed, perennial rye grass, cocksfoot, meadow foxtail and rough stalked meadow grass. The depth of planting varied from surface sowing to $1\frac{1}{4}$ inches with some seedings of red clover made at depths of 4 and 6 inches. Light had no effect on the germination of red clover seed but surface seedings failed, largely because the rather thick radicles did not penetrate the soil. A slight covering corrected this. Red clover seed germinated at all depths down to 5 inches at which depth 10% of the seed germinated as against 90-95% when sown on the surface. At 6 inches no seed germinated, although water was imbibed.—*A. J. Pieters.*

85. YOUNG, C. ERNEST. The Uba cane controversy. [From the Bundaberg Daily News.] Australian Sugar Jour. 16: 85-86. 1924.—The Fairymead Sugar Company Ltd., as a result of considerable experience with Uba cane, both as growers and manufacturers, maintains that it should be a disapproved variety or should be subject to a reduction of 5% per ton of cane, mainly because of the refractory nature of the juice and the large amount of wax which it contains, making clarification very difficult. The vacuum pan and centrifugal work and the crystallizers in motion have been hampered and slowed down sometimes by increased viscosity and sometimes by unavoidable false grain. The same recovery can not be attained when working Uba, and its viscosity prolongs the time required for manufacture. Even when sucrose is good, general purity is lower, and the ever-present wax reduces the value of the cane for milling. Again, burning is almost necessary with its certain losses of sucrose.—The Secretary of the Sugar Association in Africa claims that 99.5% of the crop is Uba and reliance on this cane is a handicap of 15-20%. Extracts are given from the report of Dr. Maxwell on South African sugar manufacture, dealing with the comparative nature of Uba cane juice, its gummy ingredients, and how the gums affect the various phases of manufacture. The excess of gums, which remain unprecipitated, is responsible not only for sucrose losses, but also for direct economic losses.—*Nellie E. Fealy.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

CARROLL W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entry 254)

86. ANONYMOUS. Edward Cleminshaw, M. A., 1849-1922. British Bryological Soc. Rept. 1: 94. 1924.—Cleminshaw was a teacher of science for several years and devoted much attention to mosses, joining the Moss Exchange Club in 1901. He was active also in the Birmingham Natural History Society and arranged the important collection of mosses belonging to the University of Birmingham.—*A. W. Evans.*

87. ANONYMOUS. Nicholas Temperley, J. P., 1844-1923. British Bryological Soc. Rept. 1: 95. 1924.—The subject of this notice was born at Hexham and died at Gateshead. He was a member of various botanical societies and took an active interest in field studies.—*A. W. Evans.*

88. ANONYMOUS. 100 Jahrgang der Allg. Forst- und Jagdzeitung. [100th anniversary of Allg. Forst- und Jagdzeitung.] Forstwiss. Centralbl. 46: 172. 1924.—The history of this journal since January 1, 1825, is outlined.—*W. N. Sparhawk.*

89. ANONYMOUS. Polska bibliografja botaniczna. [Bibliography of Polish botany.] Acta Soc. Bot. Poloniae 2: 69-80. 1924.

90. ANONYMOUS. Sugar cane. South African Sugar Jour. 8: 463. 1924.—Sugar cane did not originate in the Western Hemisphere, but "was introduced into Madeira in 1420, and into North and South America after the voyage of Columbus." It was 1st cultivated

in America about 1751 near the present site of New Orleans by Jesuits from San Domingo. The 1st sugar mill was built in 1758 in the Louisiana region. After the Revolutionary War sugar became a staple product.—*Nellie E. Fealy*.

91. ANONYMOUS. The Rev. William Wilks. *Jour. Roy. Hort. Soc.* 48: 157-160. *Fig. 27*. 1923.—This is a sketch of the life of the former secretary of the Royal Horticultural Society, who died March 23, 1923.—*J. K. Shaw*.

92. BATESON, W. Progress in biology. *Nature* 113: 644-646; 681-682. 1924.—This is an address delivered March 12 at Birbeck College and deals especially with evolution. He concludes: "The future of biology lies not in generalization, but in closer and closer analysis."—*O. A. Stevens*.

93. BUNYARD, E. A. Some early Italian gardening books. *Jour. Roy. Hort. Soc.* 48: 177-187. *Fig. 36-39*. 1923.—Numerous early Italian books dealing with plants and fruits are mentioned, some of them hitherto unknown. A bibliography of some 30 titles of books published from 1474 to 1792 is appended.—*J. K. Shaw*.

94. BUSSE. Richard Beck. *Forstwiss. Centralbl.* 46: 169-170. 1924.—Beck, for nearly 30 years professor of forestry at Tharandt, died November 18, 1923, aged 56. Besides numerous original contributions to forestry literature, he revised several text-books.—*W. N. Sparhawk*.

95. CHAMBERLAIN, EDWARD B. Joseph Jackson. *Bryologist* 27: 54. 1924.—Joseph Jackson (1847-1924), a native of England, spent nearly all his life as a teacher; botany was his avocation, mainly the systematic flora of central Massachusetts on which he published books.—*Author*.

96. FIDELI, CARLO. Un nuovo documento sul primo orto botanico pisano. [A new document on the first botanical garden at Pisa.] *Riv. Storia Sci.* 14: 177-181. 1923.—This article describes a letter written by Ghini in Nov. 1547 confirming the author's previous statements that the Luca Ghini garden had been founded by Cosimo I at Pisa in 1544 and was completed by 1546-1547.—*George Sarton*.

97. GUILLAUME, A. Eugène Mesnard (1865-1923). *Rev. Gen. Bot.* 36: 97-98. 1924.—Eugène Mesnard, professor of natural sciences at Rouen (1895-1923), devoted his earlier years to a study of the formation of vegetable oils and perfumes; and his later years mostly to meteorology.—*J. C. Gilman*.

98. MAXWELL, HERBERT. Henry John Elwes, F.R.S., V.M.H. *Jour. Roy. Hort. Soc.* 49: 40-46. 1924.—Horticulture and silviculture have lost in the death of Henry John Elwes a foremost pioneer and ready craftsman. As ornithologist, botanist, traveler and writer, he made many contributions to science.—*J. S. Bailey*.

99. POOLEY, HAROLD T. British Empire sugar. Value of the preference. *South African Sugar Jour.* 8: 441-445. 1924.—This article, copied from the London Times Trade Supplement, gives a brief general sketch of the British Empire's sugar history, discusses the necessity of increasing and protecting the Empire's sugar production, and summarizes the results which the author believes would follow from weakening the preference.—*Nellie E. Fealy*.

100. ROHDE, ELEANOR SINCLAIR. Anglo-Saxon plant-lore. *Jour. Roy. Hort. Soc.* 48: 168-176. 1923.—Four Anglo Saxon manuscripts now in the British Museum (1) the Leech Book of Bald, (2) the Lacnunga, (3) the Translations of the Herbarium of Apuleius and (4) the so-called Peri Didaxion are briefly described. These are the only surviving pieces of Saxon literature in which we can learn the plant-lore of our ancestors. Herb-lore and folk medicine lag centuries behind the knowledge of their own day. These manuscripts throw much light on the belief and customs of humble folk in Anglo Saxon times; they show a lack of Druidic beliefs in connection with plants. Numerous curious beliefs and ceremonies connected with the gathering and uses of plants are discussed, all mystical and suggestive, but behind them all lies the ancient ineradicable worship of Nature.—*J. K. Shaw*.

101. RYTZ, W. Die deutschen Pflanzennamen. [German plant names.] *Mitteil. Naturf. Ges. Bern* 1923: XXXV-XXXVII. 1924. (Abstract.)

102. SCHÜPFER. Arnold Engler. *Forstwiss. Centralbl.* 46: 168. 1924.—Engler, for 26 years professor of silviculture at Zürich, died July 15, 1923, in his 55th year. His best known work dealt with studies of forest reproduction and origin of seed.—*W. N. Sparhawk*.

103. SCHÜFFER. Udo Müller. Forstwiss. Centralbl. 46: 169. 1924.—Müller, professor of forest management at Freiburg, died October 20, 1923, at the age of 59. His special field was the study of volume and growth.—*W. N. Sparhawk.*

104. SMITH, WILLIAM G. Prof. J. E. B. Warming. Nature 113: 683-684. 1924.—Dr. Eugene Warming who died April 2 influenced botany over the whole world. He contributed to the literature for 60 years, and was known chiefly by his work on types of vegetation. Probably over $\frac{1}{2}$ of the 2000 papers referred to in the last edition of his ecological textbook were inspired or influenced by him. He was born Nov. 3, 1841, in Jutland and spent his early life in Denmark. He spent 3 years in Brazil and travelled in Greenland. He was professor of botany at the University of Copenhagen from 1885 to 1911. Further reference is made to his various publications.—*O. A. Stevens.*

105. STREUN, R. Deutschschweizerische Familiennamen und ihre Beziehungen zur Pflanzenwelt. [German-Swiss family names and their bearing upon the plant world.] Mitteil. Naturf. Ges. Bern 1923: LII-LIII. 1924. (Abstract.)

106. WENNIGER, FRANCIS J. [Rev. of: DORLODOT, [HENRI DE]. Darwinism and Catholic thought. Translated by ERNEST MESSENGER. viii + 184 p. Burns, Oates & Washbourne, Ltd.: London, 1922.] Amer. Midland Nat. 8: 211-214. 1923.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 52, 59, 92, 104, 255, 542, 696, 933)

107. ANONYMOUS. S[outh] A[frican] sugar research. South African Sugar Jour. 8: 421. 1924.—A paragraph quoted from African Industries (London) dwells on the news that the Union Government has decided upon the establishment of an experimental sugar station in South Africa.—*Nellie E. Fealy.*

108. ANONYMOUS. The Imperial College of Tropical Agriculture. Australian Sugar Jour. 16: 22. 1 fig. 1924.—The laying of the corner stone of this College at St. Augustine, Trinidad, January 14, 1924, was a step of material importance to every tropical part of the British Empire. The accomplishments of the College during its life in its temporary buildings and its official organ, "Tropical Agriculture," are discussed.—*Nellie E. Fealy.*

109. CALDWELL, OTIS W., AND FINLEY, CHARLES W. A social use of biology. Educational Rev. 66: 157-166. 1923.—A study is given of the biological articles appearing in 14 representative daily newspapers. The article indicates the type of biological knowledge going to the public and suggests a basis for high school biology.—*W. L. Eikenberry.*

110. CLEMENTS, FREDERIC E. The ecological method in teaching botany. New Phytol. 22: 98-104. 1923.—The author advocates the experimental method in teaching, with the measurement of results as related to the skill and accuracy with which the student can organize his results and apply them to other problems, and to the progress made in the various learning processes, such as observing, experimenting, reasoning, remembering, etc. The methods of teaching commonly in use have failed to give good results in training and in the permanent development of interest and knowledge. The usual classification of students on the basis of set examinations is neither fundamental nor final. The teacher should guide the student to do his own planning, observing, experimenting, thinking, and applying, and should look on teaching as a subject for experiment and measuring, rather than accept the traditional lecture-textbook-notebook method. The only objective worthy of true teaching and of life's opportunities is the training of students to be investigators from the outset. [See also following entry; and Bot. Absts. 13, Entry 1434.]—*I. F. Lewis.*

111. CLEMENTS, FREDERIC E. Content, methods and measurements in the teaching of elementary botany. New Phytol. 22: 191-203. 1923.—This is an amplification of a previous paper (see preceding entry). The content of the elementary course should be determined by informal consultation of the interests of the student rather than from the standpoint of

professor or subject. The work is done in the laboratory, in the environment of living plants either out of doors or in a greenhouse. Sections should contain 20 students. There should be no lectures, no notebooks, little if any use of the microscope, no use of keys or manuals, but close personal contact between student and teacher. The student organizes his own work and does it independently. No examinations are set, but measurements of progress indicate how far the student is entering into and profiting by the instruction. For purpose of measurement, the process of learning is divided into 6 sub-processes; observing, experimenting, remembering, reasoning, relating, and applying. The tests used for measuring progress in observation are outlined. A handbook of the process-inquiry method is in preparation.

—*I. F. Lewis.*

112. DOWNING, ELLIOT R. The relative value of laboratory instruction. *School and Soc.* 19: 769-770. 1924.—This reviews the literature of the subject and concludes that "as far as imparting information is concerned, the lecture-demonstration is quite or nearly as efficient as the laboratory method."—*W. L. Eikenberry.*

113. GRAVES, ARTHUR HARMOUNT. The lotus. *Brooklyn Bot. Gard. Leaflets* 12⁷. 4 p. 1924.—The different plants which have been called "lotus" are here discussed, particularly the lotus of the Lotus-Eaters, the Egyptian or Sacred Lotus, and the East Indian or Rose Lotus.—*Author.*

114. LAIRD, DONALD A. A report on students' attitudes toward laboratory courses. *School and Soc.* 19: 589-592. 1924.—This is an investigation of the attitude of students toward laboratory work in psychology, based upon interviews with 17 students. Evidence indicates that 14 of the number had "faked" the results shown in their notes. It is questioned whether present laboratory methods are taken seriously by students, and whether they instil the scientific method.—*W. L. Eikenberry.*

115. LARSEN, HAROLD T. Graphs in public health reports. *Amer. Jour. Public Health* 14: 585-591. 4 fig. 1924.—A variation in design of graphs is desirable in public health reports in order that they may attract the attention of readers, but the indiscriminate use of fantastic figures should be avoided.—*C. A. Ludwig.*

116. STEVENS, WILLIAM CHASE. *Plant anatomy.* xv + 398 p., 155 fig. 4th ed. rev. P. Blakiston's Son & Co.: Philadelphia, 1924.—The preparation of the 4th edition has involved emendations where debated questions have arrived at or approached solution, such as the genesis of the plastids, the constitution of chlorophyll, the structure of the cell-wall, the construction of nitrogenous foods, the ascent of water, and the operation of the stomata. There are also various additions and modifications in the chapters on plant products and reagents and processes, including improvements in the technic of fixing, staining, and mounting materials for study with the microscope; also substantial additions to the list of plant products, and methods of microchemical procedure. There are 18 chapters and a full index.—*C. S. Gager.*

117. W., C. H. The British Empire exhibition. Exhibition of pure science arranged by the Royal Society—I. *Nature* 113: 863-864. 1924.—The exhibit includes demonstrations of plant growth, preserving plant specimens, sex reversal and breeding of fowls, and fossil and modern plants of Greenland.—*O. A. Stevens.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 281, 286, 436, 466, 472, 616, 847)

118. ALLEN, IRENE M. The cytology of *Matthiola incana* with reference to the genetics of certain cultivated varieties. *New Phytol.* 23: 103-112. 44 fig. 1924.—The development of the pollen of *Matthiola* shows no cytological difference between the pure single forms and the "double-throwing" singles. The diploid number of chromosomes is 14, with no morphological dissimilarity. Previous to meiosis, renewed activity of the resting nucleus is marked by a process of nucleolar budding, the buds supplying chromatin to the developing

reticulum. The 2nd contraction figure is followed by a temporary dissociation of univalents. The heterotype chromosome is a closed ring. The bivalents are frequently joined by connecting bonds, which stain like chromatin. There is no evidence of irregular distribution of chromosomes in the reduction division.—*I. F. Lewis.*

119. BĚLAŘ, K. [Rev. of: DEHORNE, A. Contribution à l'étude comparée de l'appareil nucléaire des infusoires ciliés (*Paramecium caudatum* et *Colpidium truncatum*) des euglènes et des cyanophycées. (Comparative study of the nuclei of ciliates, Euglenoids and Cyanophyceae.) Arch. Zool. Exp. Gen. 60. 1920.] Arch. Protistenk. 44: 277-279. 1922.

120. BENOIT, J. Sur les modifications cytologiques des cellules interstitielles du testicule chez les oiseaux a activité sexuelle périodique. [The cytological modifications of the interstitial cells of the testicle in birds of periodic sexual activity.] Compt. Rend. Soc. Biol. 88: 202-205. 3 fig. 1923.

121. BÉTANCOS, L.-M. L'origine des fibrilles réticulaires. [The origin of reticular fibrils.] Compt. Rend. Acad. Sci. Paris 178: 527-528. 1924.

122. BONNET, M. Amitoses dans les cellules de desquamation uréthrale. [Amitosis in desquamating urethral cells.] Compt. Rend. Soc. Biol. 88: 87-89. 1923.—Several cases are reported and described. The view is favored that amitosis is a sign of abnormal cell activity rather than one of senescence.—*Oran Raber.*

123. BURKE, VICTOR. Notes on the Gram stain with a description of a new method. Jour. Bact. 7: 159-182. 1922.—A thorough discussion of the Gram stain is given, relative both to method and to theories of the differential stain. In a modification of the stain recommended the primary stain is aqueous methyl violet or crystal violet, the iodine solution is triple strength Lugol's solution, the decolorizer is acetone, and the counterstain is safranin. Sodium bicarbonate solution is added to the violet solution on the slide to neutralize any acidity of the bacterial culture. This makes the contrast between gram-positive and gram-negative organisms much more distinct.—*C. E. Skinner.*

124. CHAMPY, C. A propos de la spermatogenese des Grenouilles. [Spermatogenesis in frogs.] Compt. Rend. Soc. Biol. 91: 174-175. 1924.—This is a polemic note.—*Oran Raber.*

125. CONN, H. J., CHAIRMAN. An investigation of American stains. Report of Committee on Bacteriological Technic. Jour. Bact. 7: 127-148. 1922.—An investigation of biological stains manufactured by domestic and foreign firms was made by a committee of the American Society of Bacteriologists, assisted by several collaborators. The following dyes were tested: basic fuchsin, methylen blue, gentian violet, crystal violet, and methyl violet. Structural formulae, solubilities, etc. are given but no recommendations are made.—*C. E. Skinner.*

126. CONN, H. J., CHAIRMAN. An investigation of American gentian violets. Report of Committee on Bacteriological Technic. Jour. Bact. 7: 529-536. 1922.—Crystal violet is a definite chemical compound, but gentian violet and methyl violet are trade names of mixtures that vary in content with different manufacturer. Crystal violet is an important ingredient of gentian violet, is as satisfactory as gentian violet for the Gram stain, and should be substituted for it hereafter. Definite recommendations of satisfactory American violet dyes are made. Grüber's dyes are not superior to many of the American products.—*C. E. Skinner.*

127. DALCQ, ALBERT. Note sur la physiologie de l'oeuf en maturation. [Note on the physiology of the egg during maturation.] Compt. Rend. Soc. Biol. 88: 298-301. 1923.—This is a preliminary paper on the essential role of osmosis and imbibition in mitosis.—*Oran Raber.*

128. DANGEARD, P.-A. Sur la reproduction sexuelle chez le *Marchantia polymorpha* dans ses rapports avec la structure cellulaire. [The sexual reproduction of *Marchantia polymorpha* in relation to its cellular structure.] Compt. Rend. Acad. Sci. Paris 178: 267-271. 1924.—The plant cell lends itself better than the animal cell to the distinctions between vacuome, plastidome, and spherome, but the independence of its vacuome is more in question. The author decides to abandon the terms microsomes and spheromes on account of confusion and to classify the elements of the cytoplasm as follows: (1) plastidome consisting of plastids, including spheroplasts, discoplasts, and mitoplasts, according to form; (2) cytome consisting of cytosomes, including spherosomes and mitosomes, according to form; (3) vacuome con-

sisting of ordinary vacuoles, and the elementary vacuoles or metachromes. The latter are distinguished as spherochromes and mitochromes, according to form.—This terminology is applied to *Marchantia*. The oosphere at the time of fertilization contains numerous bodies belonging to the plastidome, vacuome, and cytome respectively. Evidence is presented as showing that these are also found in the sperm, indicating their possible role in heredity. At least, the cells which are transformed into male gametes certainly contain a plastidome and a vacuome, and very probably also a cytome. It is not, however, certain what form they present in the mature sperm. It may be that the zygote after fecondation transmits to the new plant only the vacuome, plastidome and cytome of the original female; or it may also receive plastids, metachromes, and cytosomes from the male, but in less number. The author inclines to the latter view.—C. H. Farr.

129. DANGEARD, P.-A., AND PIERRE DANGEARD. *Recherches sur le vacuome des algues inférieures.* [Research on the vacuome of the lower algae.] *Compt. Rend. Acad. Sci. Paris* 178: 1038-1042. *Fig. 1-5.* 1924.—A study was made using the intravital stains, neutral red and cresyl blue. The former is rose colored in neutral or acid media and orange in alkaline media. Two species of *Chlamydomonas* and one each of *Gonium*, *Eudorina*, *Volvox*, *Pediastrum*, *Chlorella*, *Scenedesmus*, and *Chloroventron* were investigated. The vacuome is usually in the form of small bodies of condensed metachromatin. The authors conclude that in these plants a vacuome is as constant a structure as the nucleus.—C. H. Farr.

130. DARLING, CHESTER ARTHUR. *Chromosome behavior in Acer platanoides.* *Amer. Jour. Botany* 10:450-457. 2 pl. 1923.—In the early history of the pollen mother-cell there are visible chromatin masses, varying in size and usually occurring in pairs, which correspond in number to the chromosomes at cell division. One or 2 bud-like structures are usually attached to the nucleus. The chromatin masses may be followed through synapsis, at which stage they become more closely paired, lengthen, and unite end to end. The chromatin threads are formed by a flowing out of the chromatin material from the chromatin masses. No evidence was found that 2 fine threads unite to form a single large one. The threads are distributed through the nucleus and condense into chromosomes which maintain themselves with little change throughout the resting stage of the daughter cells. The chromosomes of the homoeotypic division originate directly from these chromatin masses in the daughter nuclei. Essentially the same conditions were observed in the divisions of vegetative cells.—E. W. Sinnott.

131. EMBERGER, LOUIS. *Observations sur les chloroplastes des Sélaginelles.* [Observations on the chloroplasts of Selaginella.] *Compt. Rend. Soc. Biol.* 88: 513-516. 13 fig. 1923.—From studies made on *Selaginella martensii* var. *compacta* Kze., *S. pulcherrima* Liebm., and *S. kraussiana* Kze., it is concluded that the chlorophyll apparatus in any 1 cell consists of 1 plastid. When a plastid divides, the resultant parts are held together forming a chain. These chains are of infinite variety according to the form of the swellings and the shape and kind of cell. This single plastid in each cell is endowed with a remarkable polymorphism without losing its character as a single unit.—Oran Raber.

132. EMBERGER, LOUIS. *Remarque sur la cytologie des Sélaginelles.* [Note on the cytology of the Selaginellales.] *Compt. Rend. Soc. Biol.* 88: 225-226. 1923.—The relation of the chondriome to the plastids as observed in the ligule and in the sporangium is considered. Comparison is made with the condition in the Lycopodiales.—Oran Raber.

133. EMBERGER, LOUIS. *Sur le système vacuolaire des Sélaginelles.* [The vacuolar system of the Selaginellales.] *Compt. Rend. Soc. Biol.* 88: 218-219. 1 fig. 1923.—Methods of staining and preparation are given which enable one to distinguish exactly and clearly between the vacuoles and the chondriosomes.—Oran Raber.

134. GAISER, L. O. *Intracellular relations of aggregate crystals in the spadix of Anthurium.* *Bull. Torrey Bot. Club* 50: 389-398. Pl. 20. 1923.—Jeffrey denies that the formation of the compound crystals of calcium oxalate, in various plants studied by him, takes place in the fluid of cell-sap, but rather that such crystals "constitute an irregular spiny casing which surrounds the nucleus and protoplasm." A study of spadices of various species of *Anthurium* shows that the nucleus "persists intact in the cell after the crystal has become a conspicuous stellate structure in a vacuole. When the size of the crystal is such as to occupy

almost the entire lumen of the cell, the nucleus is still in evidence in a thin primordial utricle not only in this species but in the others mentioned earlier. In these forms there is certainly no evidence that the nucleus ever forms the centre about which a stellate group of crystals develops."—*P. A. Munz.*

135. GIROUD, A. Le chondriome peut-il être considéré comme un émulsion? [Can the chondriome be considered an emulsion?] *Compt. Rend. Soc. Biol.* 90: 938-939. 1924.—Evidence is given for an affirmative answer to this question.—*Oran Raber.*

136. GUILLIERMOND, A. Nouvelles observations sur l'évolution du chondriome dans le sac embryonnaire des Liliaceae. [New observations on the development of the chondriome in the embryo sac of the Liliaceae.] *Compt. Rend. Acad. Sci. Paris* 177: 1138-1140. *Fig. 1-5.* 1923.—A study is made of the nucellus and the embryo sac initials of *Lilium candidum*. Two types of chondriosomes are found. One type remains as such; the other enlarges, becomes vacuolate, and develops into a plastid.—*C. H. Farr.*

137. GUILLIERMOND, A. Quelques remarques nouvelles sur la structure des Levures. [Some new remarks on the structure of yeasts.] *Compt. Rend. Soc. Biol.* 88: 517-520. *73 fig.* 1923.—These observations largely concern the vacuoles and chondriome of *Saccharomyces ludwigii*.—*Oran Raber.*

138. GUYON, L. Le chondriome des cellules adipeuses. [The chondriome of adipose cells.] *Compt. Rend. Soc. Biol.* 90: 1324-1326. *1 pl.* 1924.—The chondriome of mature adipose cells has not been previously seen and has been denied by many to exist. The author's preparations show it to be especially rich and spread throughout the entire vesicle, with perhaps a little more around the nucleus. The limiting membrane is protoplasmic and the single fatty droplet of the white adipose tissue forms a unit of the same rank as the multiple droplets of the brown adipose tissue. [See also this issue Entry 154].—*Oran Raber.*

139. HIRSCHLER, JAN. Sur une méthode de noircissement de l'appareil de Golgi. [A method of darkening the Golgi apparatus.] *Compt. Rend. Soc. Biol.* 90: 893. 1924.—Place the tissue 6-24 hours in Champy's solution, wash in running water 6-12 hours and next place in distilled water 1-2 hours. Then leave in a 2% osmic acid solution 16-22 days at a temperature of 20-25°C. By this process, according to the author, the Golgi apparatus is very appreciably darkened.—*Oran Raber.*

140. HOVASSE, R. Influence du froid sur les processus intimes de la mitose. [Influence of cold on the details of mitosis.] *Compt. Rend. Soc. Biol.* 88: 191-192. 1923.—Parthenogenetic eggs of *Rana temporaria* L. which have developed at 0°-4° are compared with those which developed at 13°C. At the former temperature the chromosomes do not become vacuolated and lose their identity in the telophase as at the higher temperature.—*Oran Raber.*

141. JORGENSEN, C. A. Studies on Callitrichaceae. *Bot. Tidssk.* 38: 81-126. *Fig. 1-19.* 1923.—The purposes of the investigation were (1) to furnish characters for the distinction of species (2) to aid in determining the systematic position of the family. In *Callitriche autumnalis*, the haploid number of chromosomes is 3. In *C. stagnalis*, there are plants with a haploid number of 5, others with 10, although the 2 types have but slight morphological differences. In *C. verna*, the haploid number is 10; in *C. hamulata*, it is 19. Plants belonging to *C. stagnalis* show irregularities in the heterotypic division sometimes to the extent that micronuclei are formed. In plants considered hybrid between $2x + x$ types, $x = 15$. At diakinesis there are 5 bivalent and 5 univalent chromosomes. In subsequent development a quite variable behavior and distribution of the chromosomes occurs. Some small pollen grains are formed which disintegrate at an early stage. Reduction division in the ovule proceeds abnormally, micronuclei sometimes being formed. Fertilization and development of the embryo do not occur. The development of the embryo sac, pollination, fertilization and embryogeny are described for the genus. In determining the systematic position of the genus much stress must be placed on cytological characters, since the flower is greatly reduced. The outstanding characters in the structure of the ovule and in embryological development are: Epitropous ovules, large integument and a rather small nucellus, cellular endosperm—no free nuclei, for the 1st mitosis of the endosperm nucleus is followed immediately by wall formation. On the basis of his investigations, the author does not con-

sider the family related to the Euphorbiaceae nor to the Halorrhagidaceae, but would place it in the Sympetaleae, although just where in this group it belongs, he is unable to determine.—*Edward F. Castetter.*

142. JOYET-LAVERGNE, PH. L'appareil de Golgi dans la gamogonie de la Coccidie Aggregata Eberthi. [The apparatus of Golgi in the gamogony of Coccidie aggregate Eberthi.] Compt. Rend. Acad. Sci. Paris 178: 136-139. 1924.

143. KALWARYJSKI, B. E. Eclaircissement des préparations histologiques. [The clearing of histological preparations.] Compt. Rend. Soc. Biol. 90: 904-905. 1924.—A mixture of equal parts of chloroform and carbon disulphide is recommended for clearing preparations.—*Oran Raber.*

144. KERVILY, MICHEL DE. La division directe des ovocytes chez le nouveau-né humain. [The direct division of the oöcytes in the new born human infant.] Compt. Rend. Soc. Biol. 90: 1226-1227. 1924.

145. MAIGE, A. Croissance du noyau aux diverses températures en présence de sucre chez le Haricot. [Growth of the bean nucleus at different temperatures in the presence of sugar.] Compt. Rend. Soc. Biol. 88: 530-533. 1923.—Growth of the nuclei of previously starved bean cells in the presence of sugar varies with the temperature. The minimum growth temperature is 8°, the maximum 42°, and the optimum approximately 30°. The temperature exercises a direct influence on the growth of the nucleus and the nucleolus and also an indirect influence by increasing the rate of penetration of the sugar.—These critical temperatures are the same as those found for the germination of the bean, a fact which points to the same causes underlying both processes.—*Oran Raber.*

146. MAIGE, A. Influence de la température sur la décroissance, par inanition du noyau, chez le Haricot. [Influence of temperature on decrease in size of the nucleus of the bean as caused by starvation.] Compt. Rend. Soc. Biol. 88: 97-99. 1923.—The decrease in size due to starvation of the nucleus and nucleolus is accelerated by an increase in temperature and is slowed up by the presence of either small quantities of sugar in the cells or reserve proteins. A minimum dose of sugar merely slows up this decrease in size of the nucleus and nucleolus, while a larger amount causes them to increase in size, as has been previously shown.—There is for each cell a critical concentration of sugar above which assimilation predominates over deassimilation and below which the latter predominates.—*Oran Raber.*

147. MANGENOT, G. Notes sur la cytologie des Laminaires. [Notes on the cytology of the kelps.] Compt. Rend. Soc. Biol. 88: 522-523. 1923.—In *Laminaria flexicaulis* the assimilating layers of the thallus produce a rather large amount of oily inclusions. These inclusions are formed by the pheoplast which they at first surround. Later, as its formation continues, the oil accumulates on 1 side of the plastid, making a drop which becomes quite large and caps the plastid. When the process stops the drop often becomes detached from the plastid and falls into the cytoplasm.—The zoospores have a structure comparable in all respects to the antherozoids of the Fucaceae. These homologies are contrary to the opinion that the antherozoid of *Fucus* is a nuclear mass homologous to the head of the animal spermatozoid.—*Oran Raber.*

148. MELLO, FROILANO DE, JOSINA DE LIMA RIBEIRO, ET JACINTO DE SOUSA. Nouvelles recherches sur la cytologie des Eutrichomastix. [New researches on the cytology of Eutrichomastix.] Compt. Rend. Soc. Biol. 88: 317-319. 1923.

149. NIHOUL, J. Sur le chondriome du *Crinum capense*. [The chondriome of *Crinum capense*.] Compt. Rend. Soc. Biol. 88: 295-297. 1 fig. 1923.—The author has determined in *Crinum capense* (1) the existence of plastids related to chondriosomes but not necessarily connected by chondrioconts, (2) the persistence of a part of the chondriome in the adult cells, and (3) the independence of the vacuoles and chondriosomes.—*Oran Raber.*

150. NOACK, KONRAD LUDWIG. [Rev. of: NOACK, KONRAD LUDWIG. Untersuchungen über die Individualität der Plastiden bei Phanerogamen. (Investigations on the individuality of the plastids in phanerogams.) Zeitschr. Bot. 13: 1-35. 1921.] Arch. Protistenk. 44: 264-266. 1922.

151. NOËL, R. Sur l'état binuclée des cellules hépatiques. [The binucleate condition of liver cells.] Compt. Rend. Soc. Biol. 88: 212-214. 1923.—The kind of food seems to influence

the number of binucleate cells. If the animal is fed on fats the number is greater than when nourished on sugar.—The binucleate condition arises by a direct division of the nucleus.—In general the binucleate cells are grouped in areas of varying dimensions.—*Oran Raber.*

152. OSCHMANN, A. L'ovogénèse du *Tubularia mosebryanthemum* Allman. [Ovogenesis of *Tubularia mosebryanthemum* Allman.] Compt. Rend. Soc. Biol. 88: 439-441. 7 fig. 1923.

153. PETERSCHILKA, F. [Rev. of: CARTER, NELLIE. The cytology of the Cladophoraceae. Ann. Botany 33: 467-478. 1 pl., 2 fig. 1919.] Arch. Protistenk. 45: 440-441. 1922.

154. POLICARD, A. Remarques sur la structure de la cellule adipeuse des Mammifères. [Observations on the structure of the adipose cell of mammals.] Compt. Rend. Soc. Biol. 91: 167-169. 1924.—This is a discussion of the paper by Guyon. (See this issue Entry 138.)—*Oran Raber.*

155. PUYMALY, A. DE. Sur le vacuome des Algues vertes adaptées à la vie aérienne. [On the vacuome of green algae adapted to aerial life.] Compt. Rend. Acad. Sci. Paris 178: 958-960. 1924.—Fitting and others have demonstrated that xerophytism is accompanied by a high osmotic tension. The plasmolytic method has several objections as applied to micro-organisms; however, some interesting results can be obtained. The osmotic pressures of these plants are found to vary from 13 to 75 atmospheres. Intravital stains were used to delineate vacuolar structures. The vacuoles of aerial Chlorophyceae are very much reduced in size, and may even be absent. Their content is found to be alkaline in reaction.—*C. H. Farr.*

156. SALAZAR, A. L. A propos d'une observation d'Henneguy sur l'influence mutuelle des mitoses. [An observation of Henneguy on the mutual influence of mitoses.] Compt. Rend. Soc. Biol. 91: 225-226. 1924.—Henneguy had observed that in the nuclear divisions of the parablast of trout, if the chromatic elements of a dividing nucleus happened to be near the centriole of a neighboring dividing nucleus, they oriented themselves on the spindle toward the neighboring centriole as though attracted by it. The author finds this is in no sense a general phenomenon and no dynamic theory of centrioles can be based upon it.—*Oran Raber.*

157. SCRIBAN, I. A. Sur la structure et la cyto-physiologie de la cellule adipeuse chez *Glossosiphonia paludosa* C. [The structure and cyto-physiology of the adipose cell in *G. paludosa* C.] Compt. Rend. Soc. Biol. 90: 1065-1067. 1 fig. 1924.

158. TUPPER-CAREY, R. M., AND J. H. PRIESTLEY. The cell wall in the radicle of *Vicia Faba* and the shape of the meristematic cells. New Phytol. 23: 156-159. 1 fig. 1924.—The cells are tetrakaidecahedral (with 14 sides), with thick bands of cellulose occupying the angles, which are connected by thin bars across the surface of the protoplast.—*I. F. Lewis.*

ECOLOGY AND PLANT GEOGRAPHY

GEO. D. FULLER, *Editor*

(See also in this issue Entries 7, 39, 41, 59, 83, 104, 110, 155, 216, 218, 222, 230, 324, 452, 490, 491, 501, 505, 506, 507, 509, 512, 521, 552, 718, 738, 740, 754, 815, 844, 853, 854, 856, 858, 859, 860, 875, 877, 912, 954, 957, 962, 963, 971, 1000)

GENERAL, FACTORS, MEASUREMENTS

159. ADAMSON, R. S., AND T. G. B. OSBORN. On the ecology of Ooldea District [South Australia.] Trans. Roy. Soc. South Australia 46: 539-563. Pl. 32-36. 1922.—With a little less than 10 inches of rain per year the plain has a scanty covering of "bluebush" (*Kochia sedifolia*), and "saltbush" (*Atriplex vesicarium*), small grey bushes $\frac{1}{2}$ m. high, standing 2-3 m. apart, with a few annual herbs and a sparse scattering of grasses. The better conservation and utilization of the same rainfall in the sand hills results in an open forest. In the deepest sand there is a dominance of the "oak" (*Casuarina lepidophloia*) which reaches a height of 50 feet and a trunk diameter of 26 inches. Smaller trees are *Myoporum platycarpum* and the "mallees." On the sand ridges the trees are reduced to shrubs among which *Acacia* spp. and *Grevillea* spp. are notable. An analysis of the flora according to Raunkiaer's biological spectrum shows the absence of large trees and the number of perennial herbs much

below normal, but a marked excess of micro- and nano-phanerophytes (small trees and shrubs) and of annuals. The more xerophytic areas show a close correspondence to Death Valley, U. S. A.—*Geo. D. Fuller.*

160. AGHARKAR, S. P. The present position of our knowledge of the aquatic flora of India. *Jour. Indian Bot. Soc.* 3: 252-260. 1923.—This is the presidential address before the Indian Bot. Soc. at the Lucknow meeting in January, 1923. The author summarizes the work that has been done on aquatic plants in India. Little has been published dealing with non-vascular plants, and "more taxonomic work is needed;" vascular plants are better known taxonomically, and their "biology, oecology, distribution, and origin can be more profitably undertaken." The appended bibliography contains 39 titles. (See also this issue, Entry 1009.)—*Winfield Dudgeon.*

161. CLEMENTS, F. E., AND G. W. GOLDSMITH. Studies in aeration. *Carnegie Inst. Washington Year Book* 22: 305-306. 1924.—In long dry periods the composition of the soil air approaches that of the atmosphere. Following a rain, the O₂ content of the soil air decreases rapidly and the CO₂ content increases correspondingly, as deeply as the rain water penetrates.—*B. E. Livingston.*

162. CLEMENTS, F. E., AND G. W. GOLDSMITH. The phytometer method. *Carnegie Inst. Washington Year Book* 22: 303. 1924.—The use of standardized plants of *Helianthus* for comparing the climatic complexes of several stations is briefly discussed.—*B. E. Livingston.*

163. CLEMENTS, F. E., AND DOLLY LUTJEHARMS. Slope exposure studies. *Carnegie Inst. Washington Year Book* 22: 304. 1924.—A comparison of the condition complexes of the north and south exposures of Engelmann Canyon, as related to the vegetational cover, was carried out by means of standardized plants (called phytometers) and instruments. The growth increments of the phytometer plants, with the exception of those for stem height, were greater for the south exposure. Transpiration was 82% greater for the south exposure but the plants of this exposure produced 75% more dry matter than those of the north exposure. Stem-height increments were 25% less for the south than for the north exposure.—*B. E. Livingston.*

164. COOPER, WILLIAM S. An apparatus for photographic recording of quadrats. *Jour. Ecology* 12: 317-321. 2 fig. 1924.—The stand supporting the camera is placed on one side of the area to be photographed, which is thus left entirely unshaded.—*Geo D. Fuller.*

165. HILDEBRANDT, F. MERRELL. A physiological study of the climatic conditions of Maryland, as measured by plant growth. *Physiol. Res.* 2: 341-405. 1921.—This paper presents results of a study of observations on the climatic complexes for 9 different stations in Maryland, as the influence of each complex was automatically integrated by soy-bean plants grown for a period of 4 weeks from the seed, new seed being planted every 2 weeks. Corresponding instrumental observations are also reported. The work is a continuation of that previously reported by McLean. (McLEAN, F. T. A preliminary study of climatic conditions in Maryland as related to plant growth. *Physiol. Res.* 2: 129-208. 1917.) The same soil was used for all cultures, which were automatically irrigated, so that the influences of natural precipitation on soil moisture condition were largely excluded. The plantgraphs depict the seasonal march of each climatic complex as it actually affected growth in the standard plants, the latter being employed as a "living instrument" or indicator of climatic effectiveness. Climatic efficiency values for the several stations are computed from the plant data. The value for Oakland (in the western mountains) is less than $\frac{1}{2}$ as great as that for Baltimore (practically at sea-level). Many details are discussed, including some features of correlation between different kinds of growth. The rate of stem elongation was greater than that of leaf production when both rates were large. The rate of production of organic matter was nearly proportional to that of increase in foliar surface. As to instrumental data, the importance of solar radiation in determining atmometric rates (for white porcelain spheres) is emphasized.—*B. E. Livingston.*

166. HUNTINGTON, ELLSWORTH. The big trees as a climatic yard-stick. *Carnegie Inst. Washington Year Book* 22: 301. 1924.—The conclusion is expressed that the record from big trees, studied by means of correlative coefficients, may properly be used as a climatic yard-

stick for certain areas in various parts of the world, but not for other intervening areas. There is a lag of several years in the influence of precipitation on the growth features studied.—*B. E. Livingston.*

167. JEAN, F. C., AND J. E. WEAVER. **Relation of holard to root development and yield.** Carnegie Inst. Washington Year Book 22: 313. 1924.—Root penetration downward was limited to the upper 3 feet in the drier soils and branching was more thorough here than in fully irrigated soils. Depths of 5-8 feet were attained by root systems in fully irrigated soils. The plants used were wheat, maize, alfalfa, sugar-beet and potato, and the experiments were carried out at Greeley, Colorado.—*B. E. Livingston.*

168. KENOYER, L. A. **Letter to the editor on "Mixed formations in time."** Jour. Indian Bot. Soc. 3: 235. 1923.—Discussing a paper under this title (see Bot. Absts. 12, Entry 5462), the author suggests that in spite of their striking seasonal rhythm, Indian habitats do not differ sufficiently from those of the temperate West to justify a fundamentally different terminology. He thinks Indian formations should be named after either the most typical plants with perennating organs, or after the species that are most conspicuous when the vegetation is at its height.—*Winfield Dudgeon.*

169. LIPMAN, CHARLES B. **Studies on the composition of sea-water.** Carnegie Inst. Washington Year Book 22: 159. 1924.—The composition of sea-water is apparently much more variable than has been thought. Some of its constituents that are generally overlooked may be of great ecological and physiological importance.—*B. E. Livingston.*

170. SHREEVE, FORREST. **Conditions influencing soil temperatures.** Carnegie Inst. Washington Year Book 22: 63-64. 1924.—At Tucson, a clay soil with its surface blackened showed an average maximum temperature, at 3-inch depth, over 10°C. greater than the corresponding average for a similar soil with its surface whitened. At Carmel, a sandy soil with the equivalent of 0.5 inches of precipitation each week showed temperatures, at 6-inch depth, 5°-6°C. lower than that of an unirrigated control, but this difference was maintained only about 48 hours after each watering. By the end of the week the irrigated soils showed the same temperature as did the control.—*B. E. Livingston.*

171. TAYLOR, W. P., AND J. V. G. LOFTFIELD. **Destruction of the range by prairie-dogs.** Carnegie Inst. Washington Year Book 22: 314. 1924.—In northern Arizona, prairie-dogs and cattle feed on the same grasses and prefer them in the same order. Prairie-dogs appear not to eat anything that cattle do not eat.—*B. E. Livingston.*

172. WEAVER, J. E. **Plant production as a measure of environment.** Carnegie Inst. Washington Year Book 22: 312-313. 1924.—Native and crop plants integrate environmental conditions, as these affect plant growth, and give yield values that seem to be useful indices of the environmental complexes, especially with regard to water supply and evaporation conditions.—*B. E. Livingston.*

173. WEAVER, J. E., AND JOHN W. CRIST. **Water-loss from vegetation in its normal soil relation.** Carnegie Inst. Washington Year Book 22: 312. 1924.—Cylinders of undisturbed natural soil (1 square foot in cross section and 3 feet in height), bearing natural sod or agricultural plants, were used, and water loss was determined by weighing. The stations were in Kansas, Nebraska and Colorado. The sods and cultures tested generally showed losses of from less than 1 pound to more than 2 pounds per square foot per day.—*B. E. Livingston.*

174. WEINZIRL, JOHN. **The cause of explosion in chocolate candies.** Jour. Bact. 7: 599-604. 1922.—Spontaneous explosions of chocolate candies, which is a common source of loss commercially, was traced to an anaerobe, *Bacillus sporogenes*, the source of which seemed to be the dried egg white used for the fondant. Commercial dried egg albumen may easily be contaminated with hen feces, which were shown to contain *B. sporogenes*, since the eggs are not sterilized before breaking and are frequently contaminated with feces in the nest. Yeasts may also be the cause of explosions, but *Bacterium coli* is not involved.—*C. E. Skinner.*

175. WHERRY, E. T. [Rev. of: ARRHENIUS, OLOF. *Ökologische Studien in den Stockholmer schären.* (Ecological studies in the Stockholm Cays.) 123 p. *Illus.* 1920.] Ecology 2: 223-228. 1921.—The cays are tiny islands, sand-bars or rock ledges occurring in the environment of Stockholm the vegetation of which has been minutely studied by Arrhenius.

Lists of species, the geology, and methods of plant dissemination are discussed, together with the pioneer species covering bare rocks. One important feature is the number of careful soil analyses made of the soil of the different plant associations and given in terms of the H-ion concentration. A full survey of the methods used by Arrhenius in making these analyses is given in the review. The reviewer also compares these analyses with the soil analyses made in the eastern North America. He regrets that studies were not made by Arrhenius on the bacteriological and mycological floras of the soils which he examined. The writer appraises the book as an extremely valuable contribution to ecology. It is hoped that so valuable a work will soon be translated.—*H. H. M. Bowman.*

176. WORKING, EARL B. Composition of the water of the Salton Sea. Carnegie Inst. Washington Year Book 22: 66. 1924.—An analysis of water collected in June, 1923, is presented. There has been but little decrease in the volume of the Salton Sea since 1919.—*B. E. Livingston.*

STRUCTURE, BEHAVIOR, SYMBIOSIS

177. BOUGET, J. De l'influence sur les végétaux d'un séjour prolongé à haute altitude. [The influence upon plants of a prolonged stay at a high altitude.] Compt. Rend. Acad. Sci. Paris 178: 1748-1751. 1924.—*Narcissus pseudo-narcissus* was transplanted to altitudes from 800 to 2000 and even to 2860 m. At high altitudes the size is reduced from 50 to about 10 cm. The perigonal divisions of the flowers lose color and become white. The leaves become greener, and the bulb is covered with a dark coat. The time of blooming shifts from March to June. *Iris* gives similar results. During the 1st few years only vegetative growth occurs but later flowers appear. The leaves likewise are very small at 1st, but gradually become larger in later years.—*C. H. Farr.*

178. CLEMENTS, F. E., and FRANCES LONG. Experimental pollination. Carnegie Inst. Washington Year Book 22: 306. 1924.—Flowers that change color with age appear to attract the bee mainly when they are at a developmental stage with nectar available. Covering the ray-flowers of *Aster* did not prevent visits by bees but covering the flower disk with green leaf or paper generally rendered the flower unattractive to the insects.—*B. E. Livingston.*

179. COCKERELL, T. D. A. A new genus of bees from California. Entomol. News. 35: 169-171. 1924.—*Betheliella calochorti* is described from flowers of *Calochortus maweanus* Leicht. It is suggested that the insect is an oligotropic visitor to this flower and that it eats pollen.—*O. A. Stevens.*

180. COOLIDGE, KARL R. The life history of *Brephidium exilis* Bdv. (Lepid.: Lycaenidae.) Entomol. News 35: 115-121. 1924.—"The Pygmy Blue" is exceedingly abundant in the coastal region of southern California where its favorite food is the Australian salt bush (*Atriplex semmibaccata*). Notes on other species of *Atriplex* and on *Petunia parviflora* are given.—*O. A. Stevens.*

181. COSTANTIN, J. Remarques sur la vie autotrophe et la vie symbiotique. [Autotrophic and symbiotic life.] Bull. Mus. Hist. Nat. [Paris] 27: 245-248. 1921.—Records are given of the results of a series of experiments conducted with certain Orchidaceae and Lycopodiaceae by extracting the fungal associate from the roots. The liberated fungi thrive under special culture media, and the former host plants in general suffer no harmful results. While, in many cases, the fungal form can not be recognized, *Vanda tricolor* is found to be symbiotized by a species of *Rhizoctonia*.—*John M. Fogg, Jr.*

182. DUDGEON, WINFIELD. Succession of epiphytes in the *Quercus incana* forest at Landour, Western Himalayas. Preliminary note. Jour. Indian Bot. Soc. 3: 270-272. 1923.—Landour is situated at the outer edge of the Himalaya, 78° 6' E. Long., at an altitude of about 2200 m. The climate resembles that of the adjacent plains, but is about 10°C. cooler and the rainfall is greater (about 250 cm.). Epiphytic vegetation on *Quercus* and other trees shows a well-defined and characteristic succession, beginning with crustose lichens on branches 3-4 years old, through foliose and fruticose lichens, pioneer mosses, climax mosses (after about 20 years), ferns, and culminating in flowering plants. Secondary successions arise whenever the original mat of climax vegetation slips off, due to stem growth and bark decay.

Details of succession and composition of the various stages vary with exposure to wind, bark characters of the trees, "edaphic" positions on trees, and chance dissemination of the species involved. Succession among epiphytes is regarded as unique, because of the short time required to reach the climax, the unusual clearness of successive stages, the small size of the plants, and adaptations of these plants to repeated and prolonged desiccation. [See also this issue, Entry 186.]—*Author*.

183. FURTADO, C. X. Short-cuts to nectaries by *Xylocopas*. Jour. Indian Bot. Soc. 4: 28-29. 1924.—The author gives a list of flowers bitten by *Xylocopa latipes* Fabr. and *X. aestuans* Lepel., as observed by Burkill in Malaya.—*Winfield Dudgeon*.

184. GRIFFITHS, B. MILLARD. A note on the periodicity of leaf-form in *Taraxacum officinale*. New Phytol. 23: 153-156. 14 fig. 1924.—Seedlings of *T. officinale* during the 1st summer produced dentate leaves. After flowering in May of the 2nd season the plant produced fewer dentate leaves until in the late summer they were of the broad spatulate type. In the autumn the dentate type again appeared. It is suggested that variations in water pressure may be the cause of the periodical change in leaf shape. It is suggested that possibly *T. erythrospermum* is a segregate of *T. officinale* with a water pressure variation curve on 1 side of the original type mean, and *T. palustre* an analogous segregate on the other side.—*I. F. Lewis*.

185. HUNTER, ALBERT C. The sources and character of the bacteria in decomposing salmon. Jour. Bact. 7: 85-109. 1922.—Bacteria found in decomposing salmon are also ordinarily found in sea water, among which are *Bacterium aerogenes*, *B. cloacae*, *B. coli*, *B. communior*, and *Pseudomonas fluorescens*. *B. cloacae*, *P. fluorescens* and an unidentified flesh colored chromogen play an important part in salmon decomposition.—*C. E. Skinner*.

186. JENNINGS, O. E. [Rev. of: DUDGEON, WINFIELD. Succession of Epiphytes in the *Quercus incana* forest at Landour, Western Himalayas. Preliminary note. Journ. Indian Bot. Soc. 3: 270-272. 1923 (see this issue, Entry 182).] Bryologist 27: 52-53. 1924.—The reviewer commends the interest that the author has aroused by his work, points out the opportunity for similar studies in North America, and outlines the main stages mentioned by Dudgeon.—*E. B. Chamberlain*.

187. LIVINGSTON, BURTON E. Studies upon the influence of solar radiation on the rate of transpirational water-loss from plants. Carnegie Inst. Washington Year Book 22: 288-289. 1924.—The influence of indirect radiation (not directly from sun but from sky and earth) may be greater than that of direct radiation at hazy and partly cloudy times.—*Author*.

188. NICOLAS, G. Formations mycorhiziques dans une Hépatique à thalle (*Lunularia vulgaris* Micheli). [Mycorrhizal formations in the thallus of a liverwort.] Compt. Rend. Acad. Sci. Paris 178: 228-230. 1924.—It is only exceptionally that this liverwort occurs as distinct male or female thalli; and of the 2, the former is the more rare. The author found a large number of male thalli in Toulouse, some having a fungus present as an endophytic mycorrhiza. The hyphae never invade the chlorenchyma, but occupy 1 or 2 bands parallel to the veins, or are in a peripheral zone near the lower epidermis. In *Lunularia* they usually occupy a band 2-6 cells thick, the length of the veins and parallel to the lower epidermis. In other cases in the same liverwort the hyphae are localized in a single definite region. It is possible that this difference is due to 2 species of fungi. Infection is through the lower epidermis. The relationship is regarded as accidental symbiosis and sex is not conditioned thereby.—*C. H. Farr*.

189. PARTHASARTHY IYENGAR, M. O. Two instances of short-cuts by animals to the nectaries of flowers. Jour. Indian Bot. Soc. 3: 285-288. 2 pl. 1923.—In Madras, sun birds (*Arachnechthra lotenia*) bite into the bases of the long corolla tubes of *Quisqualis indica* L. for the nectar. At Ootacamund (Nilgiri Hills), carpenter bees (*Xylocopa* sp.) pierce the spurs of *Delphinium* sp.—*Winfield Dudgeon*.

190. ROBERTSON, CHARLES. Color preference of bees. Entomol. News 35: 65. 1924.—The visits of bees are determined by position of nectar, not by color of the flower. The suggestion that they do not visit red flowers is not upheld by data. Of 437 flowers whose visitors have been observed at Carlinville, Illinois, 96.2% are visited by bees. White is slightly more common than red or yellow in the colors of these flowers. Data from this and other localities are given.—*O. A. Stevens*.

VEGETATION

191. CHERMEZON, H. *Aperçu sur la végétation du littoral asturien*. [The vegetation of the coast of Asturia.] Bull. Soc. Linn. Normandie VII, 3: 159-213. 1920 [1921].—The vegetation of the coast comprises the halophytic, the intermediate, and the interior zones. The halophytic consists of halophytes. Salinity is reduced in the intermediate zone and does not affect the plants of the interior. Nevertheless, the maritime conditions, especially those of the atmosphere, react on some of the more sensitive continental species. In the interior zone the influence of the sea is exerted through the climate only. The halophytic zone includes the beaches and bases of cliffs with *Salsola Kali*, *Cakile maritima*, *Honckenya peploides*, *Convolvulus soldanella*, *Crithmum maritimum*, *Invula crithmoides*, *Frankenia laevis*, *Spergularia Lebeliana*, etc. The intermediate zone includes the moving and fixed dunes, the slopes of the cliffs, and humid places with *Eryngium maritimum*, *Ammophila arenaria*, *Euphorbia Paralias*, *Anthyllis Dillenii*, *Asphodelus fistulosus*, *Heli-anthemum guttatum*, etc. The interior zone includes woods, thickets, and especially the moors which are characteristic of the region with *Ulex europaeus*, *U. nanus*, *Erica cinerea*, *E. vagans*, *E. umbellata*, *Daboecia polifolia*, *Ormenis nobilis*, *Andryala integrifolia*, *Pteris aquilina*, etc. Sphagnum was found in some of the low marshy moors with *Erica ciliaris*, *E. Mackayi*, *Carum verticillatum*, *Wahlenbergia hederacea*, *Narthecium ossifragum*, *Helodes palustris*, *Pinguicula lusitanica*, *Scirpus fluitans*, etc. Besides the halophytes, 5 floristic elements are present: (1) the middle European including the majority of the trees, forest plants, prairie shrubs, etc.; (2) the western or Atlantic, sparser in species than (1) but covering a larger area; (3) the endemic which is of secondary importance and consists of the following families, species and varieties: *Malva moschata* L., var. *geraniifolia* Willk & Lange, *Sarothamnus cantabris* Willk (related to *S. Scoparia*), *Ononis diffusa* Ten. var. *intermedia* H. Cherm., *Laserpitium pratense* L. var. *Dufourianum* H. Cherm., *Senecio bayonensis* Boiss; (4) the Iberian and (5) the Mediterranean.—*M. Denis*.

192. GOOD, R. D'O., AND C. D. DAY. Notes on the ecology of Radipole Lake, Weymouth, [England]. Jour. Ecology 12: 322-328. Map. 1924.—An account is given of the colonization of an estuary cut off from the sea 2 years before. The bed of the depression is of stiff blue clay overlaid by a few inches of sand and silt from which the salt has slowly leached. Very few species have invaded the area from the immediately surrounding region, the dominant plants being *Atriplex*, *Suaeda*, *Spergularia* and *Salicornia*—all halophytes. There is a close correlation between the amount of salt in the substratum and the mingling of other vegetation with the halophytes. Lists of species on various parts of the area are given.—*Geo D. Fuller*.

193. HARTOG, MABEL. The vegetation of Lalitpur—an ecological sketch. Jour. Indian Bot. Soc. 3: 211-222. 1923.—Lalitpur Subdivision lies near the center of India, on the northern slopes of the Vindhian Hills, about 1000 feet above sea level. The underlying red gneiss is overlaid along the foot of the Vindhias by "black cotton soil," and along the north side of the area by "a shallow layer of red soil," while between the 2 is a zone of mixed soil. The climate is strongly periodic; annual rainfall is about 40 inches; most of the year it is hot and dry.—The low hills bear a dry forest, while more level areas (except for cultivated tracts) are covered with scrub. Nearly all trees and shrubs are deciduous. There are no herbaceous epiphytes, and few lianas, the vegetation exhibiting well-marked xerophytic characters.—Six distinct formations are recognized: (1) Formation on rocky red coarse sand, shallow and poor in humus. The gneiss hills support only a "poor type of dry forest," with a scanty undergrowth of short grass and low herbs. More level areas bear low scattered shrubs, as *Butea frondosa*, *Lagerstroemia parviflora*, and *Zizyphus nummularia*. (2) Formation on black cotton soil, a fine clay, with great water-holding capacity. *Acacia leucophlea* and *Butea* are the only important woody plants. The ground layer is a close growth of tall grasses, especially *Saccharum spontaneum* and *Anthistira scandens*. (3) Formation on a mixture of black cotton and red soils is a thick scrub, 6-8 feet high, of thorny shrubs, like *Carissa spinarum*, *Celastrus senegalensis*, *Acacia catechu*, and *Zizyphus nummularia*. (4) Formation on the Vindhian sandstone hills. The soil is finer and deeper than the gneiss residuum. The forest contains about 80 species, of which 31 trees and shrubs are listed as

abundant. Xerophytic characters are less marked, grasses are abundant, and lianas numerous. (5) Formation on damp ground. Rivers are fringed by characteristic trees, as *Terminalia glabra*, *Ficus glomerata*, and *Eugenia jambolana*. (6) Aquatic formation. The majority of the species in rivers and pools are of very wide geographic distribution.—There is an appendix of 7 pages listing the species identified from the various formations.—*Winfield Dudgeon*.

194. LAM, H. J. Vegetationsbilder aus dem Innern von Neu-Guinea. [Vegetation views of the interior of New Guinea.] Vegetationsbilder 15^{6,6,7}: 21 unnumbered p. Pl. 25-42. 1924.—The topography, climate and vegetation of a certain portion of Dutch New Guinea is given. The writer mentions especially the region from Pioniersbiwak on the Mamberamo River to Wilhelmina Mountain (4750 m.). The plates represent various views of the mountain, forest and swamp floras and of other vegetation types.—*J. C. Th. Uphof*.

195. OSBORN, T. G. B. Flora and fauna of Nuyt's Archipelago, No. 3. A sketch of the ecology of Franklin Islands. Trans. Roy. Soc. South Australia 46: 194-206. Pl. 8-11. 1922.—These are small islands south of Australia where coastal dunes are dominated by *Spinifex* and *Olearia* shrubs while the uplands are occupied by shrubs of *Rhogodia crassifolia* and *Frankenia pauciflora*. Unstable soil and severe winds seem accountable for this reduced vegetation.—*Geo. D. Fuller*.

196. SETCHELL, W. A. A botanical reconnaissance of Tahiti in the summer of 1922. Carnegie Inst. Washington Year Book 22: 169. 1924.—This is a progress report.—*B. E. Livingston*.

FLORISTICS

197. BORESCH, K. [Rev. of: PASCHER, A. Über das regionale Auftreten roter Organismen in Süßwasserseen. (The regional distribution of red organisms in fresh water lakes.) Bot. Arch. 3: 311-314. 1923 (see Bot. Absts. 13, Entry 5756).] Arch. Protistenk. 47: 138. 1923.

198. CHRISTIE, MILLER. *Primula elatior* Jacquin: its distribution in Britain. Supplementary note. Jour. Ecology 12: 314-316. 1924.—Three additional outlying stations, in addition to those already given are reported. They are at Barton, Suffolk; at Littlebury, Essex; and the Elmdon, Essex.—*Geo. D. Fuller*.

199. CLEMENTS, F. E., H. M. HALL, AND DAVID MASON. Experimental taxonomy. Carnegie Inst. Washington Year Book 22: 308. 1924.—A brief account is given of the installation and observation of long-time experiments on the subsequent behavior of plants transplanted from 1 habitat into habitats characterized by conditional complexes different from those of the original station.—*B. E. Livingston*.

200. DEGENER, OTTO. Four new stations of *Lycopodium prothallia*. Bot. Gaz. 77: 89-95. Pl. 11-13, fig. 1-2. 1924.—These stations are in Massachusetts. The prothallia of *L. obscurum* were most frequently found at a depth of 2.5-7.0 cm. The commonest diameter of this form without sporeling was 4-5 mm. The gametophytes of *L. complanatum* and *L. obscurum* can produce a sporeling whether lying with the reproductive surface in a horizontal or a vertical position.—*B. W. Wells*.

201. FLORENTIN, P., ET R. LIENHART. Présence aux environs de Nancy de *Sisyrinchium bermudiana* Linné (Iridée). [*S. bermudiana* L. near Nancy.] Compt. Rend. Soc. Biol. 90: 1057-1058. 1924.—This American plant previously reported from western Ireland, near Hamburg in Germany, in 2 separate regions in France and from Basil, Switzerland, is now reported from near Nancy. Three hypotheses are given to account for the present station: distribution by migratory aquatic birds, that it is an escape from cultivation, and that it might have been brought over in hay for the animals of the American army to some nearby camp.—*Oran Raber*.

202. FORREST, GEORGE. Exploration of N. W. Yunnan and S. E. Tibet 1921-1922. Jour. Roy. Hort. Soc. 49: 25-36. Fig. 2-9. 1924.—Exploration was continued farther north and west to and beyond the summit of the Salwin-Kiuchiang divide, farther north on the Mekong Salwin watershed and in the Salwin Valley. New Country was also visited about Mu-li and north and east of Yung-peh. The region is a particularly dry one and not prolific except in xerophytic forms of many shrubs and herbs known elsewhere in Yunnan. A number of the plants were collected and described.—*J. S. Bailey*.

203. GUINIER, PH. Observations à propos de la découverte du *Sisyrinchium bermudiana* L. aux environs de Nancy. [Discovery of *S. bermudiana* L. near Nancy.] Compt. Rend. Soc. Biol. 90: 1059-1060. 1924.—The equilibrium of plant associations is discussed. The presence of *S. bermudiana* near Nancy and similar cases of discontinuous distribution are explained as relics of a former continuous distribution.—*Oran Raber*.

204. SIBILIA, C. Ricerche floristiche sul territorio di Anagni. [Flora of the Territory of Anagni.] Nuovo Gior. Bot. Ital. N. S. 31: 50-70. 1924.—After a geographical, geological and meteorological description of the territory of Anagni, Italy, the author deals with the ecology and plant geography of the region and concludes that the vegetation is essentially of a Mediterranean type with xerophilous, herbaceous and arboreous associations except a few hydrophilous and hygrophilous ones. The vegetation is calcicolous. A bibliography is appended.—*P. D. Caldis*.

205. STOKEY, ALMA G., AND ANNA M. STARR. *Lycopodium prothallia* in western Massachusetts. Bot. Gaz. 77: 80-88. 1924.—Seven stations near South Hadley, Massachusetts, for *Lycopodium prothallia* are described. Some of the conditions characterizing the habitats are: sandy loam top soil, presence of considerable humus, moderate variation of water table, well drained soil, and no herbaceous growth. It is suggested that the conditions which are favorable for the development of white pine are favorable for *Lycopodium prothallia* growth.—*B. W. Wells*.

206. SVEDELIUS, NILS. On the discontinuous geographical distribution of some tropical and subtropical marine algae. Arkiv för Botanik 19³: 1-70. 14 fig. 1924.—After noting the scanty amount and unreliable quality of the literature, the similarity of the algal floras of the West Indies and the Indo-Pacific Ocean, Murray's explanation of discontinuity based on climatic changes in former epochs, and the impossibility of explaining all present distribution on the basis of factors operative at the present time, the author cites his explanation, given in 1905, of the similarity of the West Indian and Indo-Pacific floras based on the evidence that the Pacific Ocean and the Caribbean Sea were formerly continuous. He then gives details, illustrated by maps, of the distribution of various families and genera which support the hypothesis. Similar evidence supports the hypothesis that the Mediterranean has received several forms from the southeast during Tertiary times when an open connection with the Indian Ocean existed.—*Geo. D. Fuller*.

207. WARD, F. KINGDON. The flora of the Tibetan marches. Jour. Roy. Hort. Soc. 48: 201-212. Fig. 40-45. 1923.—The country east of the Kin-sha-kiang is a lofty limestone plateau with an altitude of 10,000 to 12,000 feet with peaks rising to 20,000 feet. The entire region has been glaciated. Woody plants are, compared with western Yunnan, poorly represented but the country is amazingly rich in herbaceous alpine. This is accounted for by the warm and cold seasonal droughts which are inimical if not fatal to the former but do not affect the latter. Thus the genus *Primula* tends to expand from the city of Likiang in N. W. Yunnan to the northeastward and to diminish northwestward, while with *Rhododendron* the situation is reversed.—Many species and genera of actual or potential value as ornamental plants are mentioned and their habitat described. It is a flora of amazing wealth on the fringes of a vast unexplored mountain region.—*J. K. Shaw*.

APPLIED ECOLOGY

208. BEECRAFT, CHARLOTTE. The premier honey man of Florida. Florida Grower 29¹⁰: 6. 1924.—At Del Rey, Florida, bees are able to gather honey throughout the entire year. The cabbage palmetto and the scrub palmetto make a good grade of light amber honey, that from the former being so thin that it is best blended with strong honey. The black mangrove is 1 of the best honey plants giving a mild, light amber product. The orange is uncertain.—*J. C. Th. Uphof*.

209. HALL, H. M., AND FRANCES LONG. Rubber plants. Carnegie Inst. Washington Year Book 22: 310-311. 1924.—This is a progress report on studies of species of *Asclepias* and *Chrysanthamnus* with reference to possible rubber production from these plants.—*B. E. Livingston*.

210. PHILLIPS, E. F. Some of the wonders of pollen. *Gleanings in Bee Culture* 52: 140-145. Solving the mysteries of pollen. *Ibid.* 52: 215-218. 1924.—This is a popular discussion of the uses of pollen by honeybees in feeding their larvae.—The 1st part was reprinted in the *Flower Grower* 11: 175-177. 1924.—*E. F. Phillips.*

211. ROWELL, H. T. *Beekeeping in Florida.* *Florida Grower* 29¹⁴: 6. 1924.—This article lists the principal honey-producing plants in Highlands County, with the months of their flowering.—*J. C. Th. Uphof.*

212. WHITTET, J. N. Clovers for the apiarist. *Trials at Hawkesbury Agricultural College.* *Agric. Gaz. New South Wales* 35: 351-353. 1 fig. 1924.—In a comparative trial of annual sweet clover, *Melilotus alba* var.; Hubam, *M. alba* var.; biennial sweet clover, *M. alba*; cow-grass, *Trifolium pratense perenne*; perennial red clover, *T. pratense*; crimson clover, *T. incarnatum*; and berseem, *T. Alexandrinum*, it was found the 1st 2 species in the list gave distinctly better yields of honey.—*L. R. Waldron.*

FORESTRY

W. N. SPARHAWK, *Editor*

(See also in this Issue Entries 76, 88, 94, 98, 102, 103, 193, 194, 390, 454, 564, 580, 647, 648, 684, 685, 728, 751, 854, 858, 859, 860, 925, 933, 961, 965, 970, 988, 1004)

213. ANONYMOUS. *Die Wahrheit über den Eulenfrass.* [The truth about the pine moth epidemic.] *Deutsch. Forstzeitg.* 39: 767-768. 1924.—The damage done by the moths (*Noctua piniperda*) in eastern Germany has been greatly exaggerated. Although 169,700 hectares of forest were entirely and 320,600 hectares partially defoliated during the summer, 90% of the trees have again put forth foliage and most of the others will probably recover. Natural enemies (fungous diseases, insects, birds, and mammals) have practically put an end to the infestation.—*W. N. Sparhawk.*

214. ANONYMOUS. *Excursion to Black Hill, July 28, 1923.* *South Australian Nat.* 4: 134-136. 1923.—The native trees are especially mentioned.—*Wm. Randolph Taylor.*

215. ANONYMOUS. *Rassegna commerciale. I prezzi dei principali prodotti boschivi.* [Prices of principal forest products.] *L'Alpe.* 2nd Ser. 9: 251-253. 1922.

216. ANONYMOUS. *Some notes on the forest flora of the Looe and Seaton Valleys, South Cornwall.* *Jour. Cambridge Univ. Forest Assoc.* 1: 4-16. 1923.—In the Looe Valley, oak (*Q. sessiliflora*) predominates and is grown as coppice with 24 year rotation. Planted maritime pine thrives, while larch, Scotch pine, and spruce do not. In the Seaton Valley, planted Douglas fir and Sitka spruce have made remarkable growth. The shrubby and herbaceous flora of openings in the oak forest is listed.—*W. N. Sparhawk.*

217. ANONYMOUS. *Wald exploitation in Bosnien.* [Forest exploitation in Bosnia.] *Wiener Allg. Forst- u. Jagdzeitg.* 41: 279-280. 1923.—This is an abridgement of an article from the "Jugo-slavenska šuma," for September 29, 1923.—*F. S. Baker.*

218. ALBERT. *Ist die Rodung der Wurzelstöcke dem Waldboden von Nutzen oder von Schaden.* [Is the removal of stumps beneficial or detrimental to the forest soil?] *Zeitschr. Forst- u. Jagdw.* 55: 331-339. 1924.—H. Burger (in *Mitteil. Schweiz. Centralanst. Forst. Versuchsw.* 13), shows clearly the utility of stumps in forest soil. The characteristic structure of forest soils is due primarily to the roots of trees remaining and decaying in the soil; and the deeper porosity, aeration and watering of forest soils result, not from stump removal, but from leaving stumps in the soil. Removing the stumps leads to the formation of a shallower soil with greater moisture variations. Conifers are most susceptible to this changed condition. Contrary to the argument that old stumps are dangerous to young trees because they are the breeding places of wood-destroying fungi, it is a fact that pole-wood trees are attacked by root fungi on originally agricultural and barren soils upon which no trees formerly grew; while on forest soils, where the mycelium of the same fungi abounds in the dead wood in the soil, the trees are not attacked. The remedy lies in the abolition of clear-cutting, which makes stump removal so convenient, and of pure coniferous stands without

the broadleaf species which open up the deeper soil. The reintroduction of mixed forest and the retention of old stumps will permit deep soil culture, which is necessary to maintain the yield capacity of forest soils.—*J. Roesser.*

219. BAILER. [Rev. of: REBEL, KARL. *Waldbauliches aus Bayern. (Silviculture in Bavaria.)* 293 p. J. C. Hubers: Diessen-von-Munich, 1922.] *Zeitschr. Forst- u. Jagdw.* 55: 366-371. 1923.—The reviewer disagrees with Fabricius, who has accused Rebel of borrowing his material and representing the views of others.—*J. Roesser.*

220. BEEKMAN, H. Over de financieelen omloop voor hoogstammig djatibosch bij kaalkapbedrijf op IV groeiplaatsboniteit in de houtvesterij Margasari (Java). [The financial rotation for teak high forest with clean cutting on site quality IV in the forest district Margasari (Java).] Mededeel. Proefsta. Boschw. Dept. Landb. Nijv. en Handel (Dutch East Indies) 6. 1-166, 4 graphs. 1920.—Tables show yields for Sites III, IV, and V, with more detail as to increment and value for Site IV, and the relation between diameter and height for 5-year age classes on Site IV is shown graphically. The financial yield of different aged stands is considered from various angles. Costs are analyzed at length, and a comparison is made between the values of the ground for teak forest and for native agriculture. It is concluded that on an interest basis of $2\frac{1}{2}$ -3% the financial rotation will not exceed 50 years, and for $3\frac{1}{4}$ -3 $\frac{1}{2}$ % it will be nearer 35 years. Abnormal conditions in the timber, money, and labor markets, at the time of the study, made it difficult to determine financial status. It is further pointed out that a strictly financial rotation is not necessarily the one to follow, since the labor supply and the effect of the rotation on the stand, the soil, and the timber market, may also have to be considered.—*Carl Hartley.*

221. BERRY, JAMES BERTHOLD. *Western forest trees.* xii + 212 p. 97 fig. World Book Co.: Yonkers, New York, 1924.—Following an introductory chapter on the identification of trees and woods, the more important forest trees occurring in the western U. S. A. are briefly described in non-technical language.—*W. N. Sparhawk.*

222. BEUMEE-NIEUWLAND, N. Onderzoekingen van djatiboschgronden op Java. [Investigations of teak-forest soils in Java.] Mededeel. Proefsta. Boschw. Dept. Landb. Nijv. en Handel (Dutch East Indies) 8. 1-91. 1922.—Here are presented the 1st chemical soil analyses which have been made in Java teak forests. In general no connection can be traced between the chemical composition of the soil and the quality of the forest growing on it. Red soils, either of volcanic or limestone origin, contain no CaCO_3 , but soils arising from marl or chalk-marl contain 0-75% of CaCO_3 . The large amount of HCl which had to be added to the soils with the greatest lime content resulted in rendering the figures for the other elements in the extracts not entirely comparable. Though teak ash has been found to consist largely of phosphoric acid, it is believed that teak does not require much Ph, because good teak forest grows in Java on soil low in phosphates, and the white substance found in vessels and cracks in the tree (still erroneously called silicic acid in German literature) was shown as early as 1858 to consist of bicalciumphosphate. Teak is not, on the whole, confined to any particular type of soil. Brief mention is made of undetermined, perhaps inorganic, toxic substances associated with incomplete oxidation in certain soils. On the physical side, greater water capacity at 10 cm. depth than in the upper subsoil appears to be associated with good growth, but there were exceptions to this. Hygroscopicity gave no promise of correlation with site quality. Low permeability (measured by the number of minutes required to collect 10 cc. of H_2O from the bottom of a cylinder of soil) is taken as an index of poor physical condition of the soil. On marl soils, increasing the solubility of the Ca by adding CO_2 results in increased permeability. Plant remains thus improve soil by means of the CO_2 released in their decomposition as well by their direct physical contribution, and the still common leaf fires are therefore particularly harmful. On impermeable soils deficient in lime, Ca should be added, but this will have little effect unless sufficient CO_2 can also be assured. Na_2CO_3 exists in some localities in sufficient quantity to decrease permeability; at Manggar the humus is dissolved and carried down to such an extent as to blacken the soil as deep as 1.5 m. NaHCO_3 does not so affect permeability. The red soils, more permeable than the marl soils, can also be rendered less permeable by adding soda. The poor marl soils approach the "alkali" soils described from parts of the U. S. A., and soils in Holland which have been

injured by sea water. The long continued drouth in the teak regions during the east monsoon results in bringing alkali salts to the surface. On hilly, marl soils, erosion is an important factor in soil impoverishment. Mahogany plantations seem to bring the soil into much better condition than does teak, the upper subsoil being more permeable than the surface soil under mahogany, while under nearby teak the reverse is true. This relation between the permeability of the surface and upper subsoil layers is considered important. The atmosphere under mahogany does not become so dry during the east monsoon, as under teak, and undergrowth is therefore better. Substituting for teak, or mixing with it, some species like mahogany, is recommended.—*Carl Hartley.*

223. BITTERLICH, E. *Der Kampf gegen die Heidelbeere—ein unblutiger Eroberungskrieg.* [The fight against the blueberry—a bloodless conquest.] *Wiener. Allg. Forst.- u. Jagdzeitg.* 41: 237-238. 1923.—*Vaccinium myrtillus* occupies lands in Austria capable of producing 500,000 cu. m. of wood a year. Soils covered with this shrub are strongly acid and are unproductive, as the blueberry has only a slight value for early spring forage, while natural reproduction of forests is impossible. Three remedies may be used: (1) rooting out the bushes, (2) fertilizing the soil to correct its acidity, and (3) shading out the brush. The last is most practicable. By deep planting, trees can be rooted in soil layers below the acid "raw-humus" and will flourish. When a canopy is formed the *Vaccinium* and its acid loving associates, such as heather and rhododendron, will be shaded out.—*F. S. Baker.*

224. BLANCO, CENOBIO. *Notas adicionales a la monografía del Chico Zapote.* [Notes on chico zapote (*Achras sapota*).] *México Forest.* 2: 46-51. 1924.—The latex of this tree (chicle) was 1st exploited commercially about 1860-1865. The method of collecting is described. The tree occurs in commercial quantities below 200 m. elevation, from the southern part of Sinaloa and Tamaulipas to Honduras. Tallies on several sample plots show it to comprise 12-70% of all trees above 15 cm. diameter. Reproduction is abundant, but growth very slow. A growth table is presented, showing that an average diameter of 60 cm. and a height of 10 m. are reached in 162 years. The average yield of chicle ranges from 400 gm. for a tree 30 cm. in diameter, to 15 kgm. for trees 1.8 m. in diameter.—*W. N. Sparhawk.*

225. BROOKS, A. B. *West Virginia trees.* *West Virginia Agric. Exp. Sta. Bull.* 175. 1-242. 103 pl. 1920.—Descriptions and illustrations of 101 native trees are given, with notes on their distribution and economic value. Keys for identification are based principally on appearance of bark, fruit, and foliage.—*W. N. Sparhawk.*

226. BUSSE. [Rev. of: JUNACK. *Reinertragstabeln für die Berechnung von Ertragswerten der Waldbestände mit Erläuterungen.* (Net yield tables for valuing forest stands, with explanations.) *Der Deutsche Forstwirt*: Berlin, (1924?).] *Deutsch. Forstzeitg.* 39: 375-376. 1924.

227. CALDER, JAMES C. *Some impressions of Canadian timber resources.* *Jour. Cambridge Univ. Forest Assoc.* 2^o: 4-9. 1924.

228. CARY, AUSTIN. *A manual for northern woodsmen.* 3d ed. ix + 302 p. *Illus.* Harvard Univ. Press: Cambridge, Massachusetts, 1924.—New matter and tables have been added, especially dealing with topographic mapping and timber estimating in western North America. The 5 main divisions are: land surveying, forest maps, log and wood measurement, timber estimating, and tables.—*W. N. Sparhawk.*

229. CHARBULA, F. *Der österreichische Staatswald in der Monarchie und in der Republik.* [Austrian state forestry under the monarchy and the republic.] *Wiener Allg. Forst.- u. Jagdzeitg.* 42: 85-86. 1924.—This article deals with the state forest administration, leaving out all references to silviculture.—*F. S. Baker.*

230. CUBITT, G. E. S. *Forestry in the Malay Peninsula.* (A statement prepared for the British Empire Forestry Conference, Canada, 1923.) 24 p. 1 map. Federated Malay States Govt. Print. Office: Kuala Lumpur, 1924.—Of the British portion of the peninsula, 37,712 square miles or 72% is covered with forest. The percentages for individual units are: Straits Settlements 18, Federated States 76, Johore 52, Kedah 75, Perlis 38, Kelantan 83, and Trengganu 84. The littoral belt includes mangrove forests and dry forests, composed of narrow belts of *Casuarina* or mixed stands of broadleaved evergreens. The inland forests include fresh water swamps, dry lowland forests in which various dipterocarps predominate,

and high hill forests (over 2,000 feet elevation). The hill forests, which are more valuable for protection of stream-flow and prevention of erosion than for timber, contain very few dipterocarps but many conifers, species of *Agathis*, *Dacrydium*, and *Podocarpus*.—Only 350 square miles belong to private owners, while 5,207 square miles, mostly in the Federated States, are set aside for permanent timber production. This area is to be increased. Forest legislation and the history of the administrative organization are described. The Straits Settlements and Federated States have one forest department, which has lent trained officers to organize the departments in Johore and Kedah. Trengganu, Kelantan and Perlis have no forest departments. The principal forestry work consists of improvement fellings to favor the natural regeneration of the better species. The moist climate renders fire protection unnecessary. Private forestry is confined to the 2,000,000 acres of planted *Hevea* and small areas of gutta percha.—The standard timber of the country is "chengal" (*Balanocarpus* sp.), and this with other dipterocarps produce over $\frac{1}{2}$ the commercial timber. The woods of 24 principal timber species are briefly described. The lumber industry employs 30,000 persons, mostly only part of the year, producing 500,000 tons of timber and 4,750,000 tons of firewood. The principal minor industry is tapping of damar-penak (*Balanocarpus Heimi*). As the annual consumption probably already exceeds the net growth in merchantable forests, to make the country permanently self-supporting in timber it will be necessary to restrict consumption, economize in the use of wood, and maintain and increase timber supplies.—Forestry research was definitely organized in 1915, although some work in forest botany was done previously. Great progress has been made since 1918.—Tables show forest areas, revenues and expenditures, increment, cut, exports and imports. Publications dealing with forestry in the country are listed.—*W. N. Sparhawk.*

231. DEN BERGER, L. G., AND H. BEEKMAN. *Inleiding tot de herkenning van hout in de praktijk*. [Introduction to the identification of wood.] Mededeel. Proefsta. Boschw. Dept. Landb. Nijv. en Handel (Dutch East Indies) 7. 1-55. 5 pl. 1922.—A general discussion of wood structure and its use in wood identification is followed by detailed descriptions of the wood of *Quercus pseudomolucca*, *Toona febrifuga*, *Intsia amboinensis*, *Michelia montana*, *Podocarpus amara*, *Dialium platysepalum*, *Dipterocarpus trinervis*, *Eusideroxylon Zwageri*, *Dehaasia* sp., *Alstonia villosa*, *Shorea* sp., and *Gluta reinghas*. For each, there are given specific gravity, grain (straight or otherwise), fineness, feel (smooth or rough), hardness (ease of working), lustre, color, odor, taste, color of aqueous and alkaline extracts, burning qualities, and, in considerable detail, the microscopic structure. The species described range in specific gravity from 0.32-0.47 for *Toona febrifuga* to 0.95 for *Dialium platysepalum* and 0.85-1.15 for *Eusideroxylon Zwageri*. In addition, the wood structure is figured for *Ochanostachys amentacea*, *Oroxylum indicum*, *Mymecylon* sp., and *Alstonia scholaris*.—*Carl Hartley.*

232. ESCHERICH, K. [Rev. of: WOLFF, MAX, AND ANTON KRAUSSE. *Die wichtigsten Forstinsekten*. (The most important forest insects.) Ed. 2, rev. 216 p., 203 fig. J. Neumann: Neudamm, 1922.] Forstwiss. Centralbl. 46: 83-84. 1924.—The reviewer deplores the author's allegiance to the code of strict priority in nomenclature, and also points out that the larva shown in Fig. 77 is *Chrysobotris*, not *Agrilus*.—*W. N. Sparhawk.*

233. FELT, EPHRAIM P. *Manual of tree and shrub insects*. xxvi + 382 p. 256 fig. Mac-Millan Co.: New York, 1924.—Part I is a brief discussion of insects in general, with an outline of control methods. Part II describes insects attacking shade and ornamental trees and shrubs, Part III deals with insects injurious to forest trees, and Part IV is a brief systematic account of the more important groups of insects affecting trees and shrubs.—*W. N. Sparhawk.*

234. GLÜCK, KARL. *Zur Waldstreufrage*. [The question of forest litter.] *Weiner. Allg. Forst- u. Jagdzeitg.* 42: 115-117. 1924.—This article summarizes the findings to date in regard to the utilization of litter from the forests for bedding material for stock and for fertilizer. It has much less value for this purpose than straw, while its removal from the forest means a remarkable reduction in site quality and in growth, especially on poor soils.—*F. S. Baker.*

235. HARTMAN, FRANZ. Zum Nährstoffkreislauf im Walde. [Materials that nourish the forest.] Allg. Forst- u. Jagdzeitg. 41: 250. 1923.—This article discusses forest management on limestone soils, where humus commonly disintegrates very rapidly. For this reason, on most sites broadleaf trees with a heavy leaf fall are more desirable than conifers, which must be limited to cool, moist areas, where too dense broadleaf cover may lead to accumulations of raw humus. On the other hand, conifers on warm, sunny sites will usually let grass come in. Careful study of local sites and use of the most suitable species on each is necessary to maintain natural conditions and the highest productivity.—*F. S. Baker.*
236. HAVELIK, KARL. Die Ursachen des Zugrundegehens der Fichte durch Nonnenfrass. [Causes of the destruction of spruce by the nun caterpillar.] Wiener Allg. Forst- u. Jagdzeitg. 42: 67-68. 1924.—This article discusses the differences in behavior of *Picea excelsa* and *Pinus silvestris* in Austria, the conclusions being that spruce is more susceptible to caterpillar attacks, partly because it is not native to the region and is not entirely suited to the climate and soil, while the pine grows in full vigor. The 2nd reason is that the bud scales of pine, being much thicker than those of spruce, resist attack until the caterpillars are nearly full size. Small caterpillars, soon after hatching, destroy spruce buds.—*F. S. Baker.*
237. HERBER, R. Taylorsystem und Forstbetrieb. [Taylor system and forest management.] Zeitschr. Forst- u. Jagdw. 55: 289-297. 1923.—The Taylor system of scientific management is discussed in its application of forestry, and its use in planting work is illustrated. The system with its "Pensum" idea should be especially valuable in connection with lumbering in regions where woods workers are scarce, in order to increase the efficiency of the existing personnel.—*J. Roesser.*
238. HERRMANN. [Rev. of: ANDÉS, LOUIS EDGAR. Die Harzprodukte. (Resin products.) 2d ed. A. Hartleben: Vienna and Leipzig, (1924 ?).] Deutsch. Forstzeitg. 39: 840-841. 1924.—The most important part of the book, the technical description of methods, is lacking in clarity. Several errors are noted.—*W. N. Sparhawk.*
239. HERRMANN. [Rev. of: HEGI, GUSTAV. Illustrierte Flora von Mitteleuropa. (Illustrated flora of Central Europe.) Vol. 4, Part 3. 579 p. Illus. J. F. Lehmann, Munich, 1924 (?).] Deutsch. Forstzeitg. 39: 809-810. 1924.—In this volume H. GAMS covers the Leguminosae.—*W. N. Sparhawk.*
240. HICOCK, HENRY W. Better forests for Connecticut. Connecticut [New Haven] Agric. Exp. Sta. Bull. 253. 130-140. 1924.—The relatively large amount of land suitable for producing forests should be utilized for that purpose. Suggestions are made regarding the care of woodlands and protection against forest fires. Inequitable taxation of growing forests is said to lead to too early harvesting.—*Henry Dorsey.*
241. HILF, H. H. Die Verwendung des Waldigels in der Kiefernwirtschaft. [The use of the "Waldigel" (a form of cultivator) in the management of pine.] Zeitschr. Forst- u. Jagdw. 55: 303-309. 1 fig. 1923.—This implement was especially built for use in the Prussian forest of Biesenthal, after the ordinary "Igel" was found too light for the work. The new cultivator has proved very satisfactory in cultivating plantations; in wounding the soil under stands and destroying undesirable ground-cover, in preparing seed beds, and in clearing fire lines.—*J. Roesser.*
242. HOHENTHAL, G. v. Salisch's Forstästhetik und der Dauerwald. [Forest aesthetics and the continuous forest.] Zeitschr. Forst- u. Jagdw. 55: 425-427. 1923.—This is a brief discussion of the relation between the old selection forest, the continuous forest, and the idea of forest aesthetics.—*J. Roesser.*
243. JENSEN. Nochmals: Eine eigentümliche Beschädigung des Maitriebes von *Pinus silvestris* durch die Julistürme im Jahre 1922. [A singular injury to the new shoots of *P. silvestris* caused by the July 1922 storms.] Zeitschr. Forst- u. Jagdw. 55: 309-310. 1923.—Injury similar to that noted by Wolff and Krausse, [see Bot. Absts. 13, Entry 5813], was noted in the forest of Schnecken in the summer of 1921. The injury was also due to "rubbing," but in this instance, the zone of damage extended about 15 m. into a 30-year old dense pole stand which had been opened during the preceding winter in the construction of a highway. The direct cause of injury was wind.—*J. Roesser.*

244. K. Notizen über Wald und Holz in der Republik Estland. [Forests and timber of Esthonia.] Deutsch. Forstzeitg. 39: 758-759. 1924.—Forest covers 770,000 hectares, or 20.1% of the whole area of Esthonia. Conifers occupy 67.85%, broad-leaved trees 28.69%, and scrub 3.46%. Before the war the forests were mostly in large private holdings and were well cared for. Upon the establishment of the Republic all holdings over 50 hectares, 680,974 hectares in all, were confiscated by the State. No reforestation of cut over areas has been done since 1918, and the annual cut far exceeds the growth, being 5-6 times as much in accessible districts.—*W. N. Sparhawk.*

245. KANEHIRA, RYOZO. Anatomical notes on Indian woods. Dept. Forest. Govt. Res. Inst. Bull. 4. (1)-(2), 1-40. 1 pl. Taihoku, Formosa. 1924.—The anatomical structure is described for 105 species belonging to 76 genera and 34 families, and an analytical key is given, together with a summary. In an appendix are described 6 foreign woods that are used in Japan.—*W. N. Sparhawk.*

246. KANEHIRA, RYOZO. Identification of Philippine woods by anatomical characters. (1) + 73 p. 2 pl. Dept. Forest., Govt. Res. Inst.: Taihoku, Formosa, 1924.—The anatomical characteristics are described for 160 species, representing 112 genera and 42 families. Part 2 is an analytical key, and part 3 summarizes the occurrence of various characteristics.—*W. N. Sparhawk.*

247. KLIMASCH, JOS. "Für den Fortschritt in unserem Durchforstungswesen." [For progress in thinnings.] Wiener Allg. Forst- u. Jagdzeitg. 41: 267-269. 1923.—This is a criticism of Heinrich Lorenze's article of the same title in the 1st 1923 issue of "Blätter aus dem Walde."—*F. S. Baker.*

248. LINCKE. Die Waldbrand-Meldeeinrichtung in der Herzogl. Arenbergischen Oberförsterei Haltern. [The system of forest fire reporting in the Haltern forest in the duchy of Arenberg.] Zeitschr. Forst- u. Jagdw. 55: 284-289. Fig. 1-4. 1923.—The present fire detection system, the result of considerable experimentation, was made necessary by the proximity of the Westphalia industrial district, whose people spend their holidays in Haltern. From 1902 to 1922, 98 fires have damaged the forest. The detection system consists of 2 lookout towers equipped with observation tables and fire finders for locating fires. Private long distance telephone connection is had by each tower with the forester in charge and 3 other forest officers. The location of a fire is determined by the intersection of the angles reported from the 2 lookouts.—*J. Roser.*

249. LÜDERSEN. "Alles schon dagewesen." ["It all existed in the past."] Zeitschr. Forst- u. Jagdw. 55: 421-425. 1923.—Because the lack of funds in 1837 and 1838 precluded artificial seeding, natural reproduction under open 100-140 year pine stands was obtained as a result of plowing the soil. The later adoption of clear cutting may be traced back to conditions existing at that time.—*J. Roser.*

250. M., E. DE. Jurisprudence. Incendie de bois. [A legal case relating to forest fires.] Bull. Soc. Centrale Forest. Belgique. 30: 445-447. 1923.—The Belgian law of responsibility of a property owner is stated. The court decided that an owner is not liable for damages resulting from a fire originating on and spreading from his property through no fault of his.—*H. T. Gisborne.*

251. MARSCHNER. Naturverjüngungswirtschaft und Forstbetriebseinrichtung. [Natural reproduction and systems of forest management.] Wiener Allg. Forst- u. Jagdzeitg. 41: 281. 1923.—After 70 years of general adhesion to clean-cutting and planting, more natural methods have taken the country by storm on account of widespread disasters following the earlier method. This has involved fundamental changes in logging methods, in the designation of cutting areas, and in the determination of annual felling budgets, all in the direction of greater complexity. Some of the more important changes are discussed.—*F. S. Baker.*

252. MARTIN. Die Bedeutung der Forsteinrichtung, ihr Verhältnis zum Waldbau und ihre Organisation. [The importance of forest regulation, its relation to silviculture, and its organization.] Zeitschr. Forst- u. Jagdw. 55: 404-415. 1923.—Opinions differ as to the importance of forest regulation. Eberbach and Möller, in particular, minimize the importance of this factor, which is intimately related to silviculture and management. The problem

of increment and growing stock, the chief element of regulation, is considered and especially the methods advocated by various foresters for determining the increment. Whether the problems of regulation are handled by specialized institutions or by the forest personnel, the bodies responsible in either case should be of permanent character.—*J. Roeser.*

253. MARTINEZ, MAXIMINO. Chicozapote (*Achras sapota* L.). México Forest. 2: 39-40. 1924.—This is a brief description of the tree, which yields chicle. Its fruit is edible, the bark and seed are used in medicine, and the wood is valuable. It is also called zapotillo and xixotzapotl.—*W. N. Sparhawk.*

254. NACHTIGALL. Geschichtliches aus der hannov. Forstinspektion Herzberg und der preuss. Oberförsterei Herzberg. [Historical account of the Hanoverian forest inspection district of Herzberg and the Prussian forest range of Herzberg.] Zeitschr. Forst- u. Jagdw. 55: 257-278. 1923.—The compartment of Aue near Herzberg is the principal locality discussed. After briefly describing the physical features, the history of the forest rights, including pasturage, timber, and land uses, is summarized. Changes in treatment of the forest after commutation of rights is considered with reference particularly to the species cultivated. The development and control of the converted stands is discussed.—*J. Roeser.*

255. NUTTALL, G. CLARKE. Trees and how they grow. xi + 184 p. 70 pl. Cassell & Co. Ltd.: London, 1923.—This is a popular description of the more common native and introduced trees of England.—*W. N. Sparhawk.*

256. ORDE-POWLETT, N. Rabbits and sycamores. Jour. Cambridge Univ. Forest. Assoc. 2: 12-13. 1923.—Rabbits do not damage sycamore saplings under about 5 inches girth, but kill many larger trees by girdling. This is probably due to a copious sweet sap exuded in the early spring from wounds in trees over 15-20 years old. In younger trees the bleeding is negligible.—*W. N. Sparhawk.*

257. PACK, ARTHUR NEWTON. Our vanishing forests. xvi + 189 p. 51 fig. MacMillan Co.: New York, 1923.—This is a popular presentation of the economic role of forests and forest products in the U. S. A., with a plea for a comprehensive policy of conservation and reforestation.—*W. N. Sparhawk.*

258. PAVARI, ALDO. Studio preliminare sulla coltura di specie forestali esotiche in Italia. II. Parte descrittiva. Sezione 1ª, Conifere. [A preliminary study of the cultivation in Italy of exotic forest trees. II. Descriptive. 1. Conifers.] Ann. R. Ist. Superiore Nazion. Forest. Firenze 62: i-iii + 1-337. 6 pl. 1920-1921.—This treats, in varying detail, of the botany, silvics, silviculture, history of planting in Europe and results of planting in Italy of the following species: *Abies amabilis*, *A. cephalonica*, *A. cilicia*, *A. concolor*, *A. grandis*, *A. nobilis*, *A. nordmanniana*, *A. numidica*, *A. pinsapo*; *Cedrus atlantica*, *C. Deodara*; *Chamaecyparis lawsoniana*, *C. nultkaensis*, *C. obtusa*, *C. sphaeroidea*; *Cryptomeria japonica*; *Cupressus arizonica*, *C. lusitanica*, *C. macrocarpa*, *C. torulosa*; *Juniperus virginiana*; *Larix leptolepis*, *L. sibirica*; *Libocedrus decurrens*; *Picea alba*, *P. morinda*, *P. omorica*, *P. orientalis*, *P. pungens*, *P. silkaensis*; *Pinus banksiana*; *P. canariensis*, *P. Coulteri*, *P. excelsa*, *P. insignis*, *P. Jeffreyi*, *P. mitis*, *P. murrayana*, *P. palustris*, *P. ponderosa*, *P. strobus*, *P. taeda*; *Pseudotsuga Douglasii*, *P. glauca*, *P. macrocarpa*, *Sequoia gigantea*, *S. sempervirens*; *Taxodium distichum*; *Thuja gigantea*; and *Tsuga mertensiana*. Brief references are also made to 142 other species, varieties and hybrids of the following genera: *Abies*, *Biota*, *Callitris*, *Cedrus*, *Chamaecyparis*, *Cupressus*, *Fitzroya*, *Keteleeria*, *Larix*, *Libocedrus*, *Picea*, *Pinus*, *Podocarpus*, *Pseudolarix*, *Pseudotsuga*, *Taiwania*, *Taxodium*, *Thuja*, *Thuyopsis*, *Tsuga*.—A bibliography lists 253 publications of a general nature, and 132 dealing specifically with conifers.—*Ferdinand W. Haasis.*

259. R., E. Congrès de 1923 et 30^e anniversaire de la fondation et de la présidence de la Société. [Congress of 1923 on the 30th anniversary of the Belgian forestry society.] Bull. Soc. Centrale Forest. Belgique. 30: 341-367. 1923.—This is a brief account of the Belgian Society and of the areas visited in the forest of Soignes, together with non-technical speeches.—*H. T. Gisborne.*

260. REYES, LUIS J. Woods of the Philippine dipterocarps. Philippine Jour. Sci. 22: 291-344. Pl. 1-31. 1923.—Although the Dipterocarpaceae comprise 75% of the timber in Philippine forests, these species were little known or utilized prior to 1898. They have since

gained the leading position in the timber trade of the Islands, but in spite of the wide variation in appearance and physical properties there is still much confusion in distinguishing the different species. This paper details the results of a preliminary survey of the comparative anatomy and microscopic characteristics of dipterocarp woods. After a detailed description of the wood of a typical species (*Parashorea malaanonan*) and a discussion of the comparative anatomy of the more important commercial species, the characteristic features of the following woods are described with notes on their uses and distribution: (1) Narig group—*Vatica mangachapoi*; (2) Apitong group—*Dipterocarpus grandiflora*, *D. lasiopodus*, *D. vernicifluus*; (3) Palosapis group—*Anisoptera thurifera*, *A. Curtisii*; (4) Lauaan group—*Shorea palosapis*, *S. teysmanniana*, *S. negrosensis*, *S. polysperma*, *S. mindanensis*, *S. eximia*, *Pentacme mindanensis*, *P. contorta*, *Parashorea malaanonan*; (5) Yakal group—*Hopea mindanensis*, *H. plagata*, *Balanocarpus cagayanensis*, *Isoptera borneensis*, *Shorea balangeran*, *S. guiso*; (6) Manggachapui group—*Hopea acuminata*, *H. philippinensis*, *H. Pierrei*. Photographs of the cross section of each of these woods are shown.—*W. N. Sparhawk*.

261. ROSE AND OTHERS. (Seed committee of the Forestry Commission of the Reich.) *Beschluss des Reichsforstwirtschaftsrates betreffend Beschaffung einwandfreien Saatgutes für die deutsche Forstwirtschaft*. [Report of the committee on assuring suitable seed for German forestry.] *Deutsch. Forstzeitg.* 39: 829-833. 1924.—It is recommended that domestic production of certified tree seed be fostered according to a detailed plan which is presented, that imports (except of larch and Douglas fir seed) be restricted by means of a high tariff, and that seed prices be fixed on the basis of germination tests.—*W. N. Sparhawk*.

262. S. *Der hohe Wert der Zirbelkiefer für das Alpenland*. [The high value of the Swiss stone pine in alpine lands.] *Wiener Allg. Forst- u. Jagdzeitg.* 42: 33. 1924.—In high altitude forests *Pinus cembra* is utilized to protect more valuable species. It is readily grown in nurseries. The seed is stratified in moist sand over winter, is soaked in salt water for several days prior to sowing and is coated with red lead to protect it from rodents. It germinates readily, usually showing 60-70% germination. It is usually transplanted at the end of 2 years and then held 4 years in the transplant bed before out-planting.—*F. S. Baker*.

263. SCHENCK, C. A. *Rotation*. *Jour. Cambridge Univ. Forest Assoc.* 21: 5-10. 1923.—The idea of a prescribed rotation, which was the basis of the most primitive forestry practice, is not compatible with the most effective utilization of land for growing timber, from the standpoint of financial return, silviculture, or protection. Forests never grow according to standardized yield tables, nor is it possible to predict yields or other conditions which affect returns more than 10-20 years ahead.—*W. N. Sparhawk*.

264. SCHNEIDER. *Die Wuchsleistungen der Esche*. [Yields of ash.] *Deutsch. Forstzeitg.* 39: 765-767. 2 fig. 1924.—In certain parts of Germany considerable attention has been given during the last 15 years to the culture of ash (*Fraxinus excelsior*) because of the demand for and high price of ash timber and because it was believed to yield greater volumes than oak or beech. Measurements from several sample plots are given which show that ash leads beech in height, diameter, and volume growth up to about 35 years, but that it falls far behind in older stands. Mean annual increment of ash culminates at 42 years; of beech, at 67 years. Where both are planted in mixture, the densely matted lateral roots of the ash prevent the beech from developing laterals and eventually cause it to die.—*W. N. Sparhawk*.

265. SCHUBERT, J. *Über Gesetzmässigkeiten und ihren mathematischen Ausdruck mit Beispielen aus der forstlichen Zuwachslehre*. [Natural laws and their mathematical expression with illustrations from forest increment study.] *Zeitschr. Forst- u. Jagdw.* 55: 278-284. 1923.—The author discusses and illustrates the calculation of the arithmetical mean and the average error, and the application of mathematical methods in the study of increment.—*J. Roesser*.

266. SCHWAPPACH. [Rev. of: BLOLEY, E. H. *Die Forsteinrichtung auf der Grundlage der Erfahrung und insbesondere das Kontrollverfahren*. (Forest organization from the standpoint of experience and especially of management experience.) Original ed. in French, 1921; German translation by EBERBACH. G. F. Müller; Karlsruhe.] *Zeitschr. Forst- u. Jagdw.* 55: 435-437. 1923.—The book is valuable not only for its discussion of management and economic principles, but also for its exposition of methods for obtaining increment. Schwappach

does not believe Biolley's method is generally applicable to German conditions or to extensive forest areas, and points out the disadvantages of repeated caliperings of all trees over a certain size within a stand. He leans strongly to the calculation of increment by use of small, permanent sample plots. [See also Bot. Absts. 13, Entry 7655.]—*J. Roesser.*

267. SCHWAPPACH. [REV. of: KEMPSKI. *Die Forstwirtschaft Niederländisch-Indiens.* (Forestry in the Dutch East Indies.) Paul Parey: Berlin, 1924.] *Deutsch. Forstzeitg.* 39: 492-493. 1924.—The 106 million hectares of forest in the Netherlands East Indies promise to become an important permanent source of supply of timber and other forest products.—*W. N. Sparhawk.*

268. SEITZ. *Fraget die Eichen, wie sie wachsen.* [Ask the oaks how they grow.] *Zeitschr. Forst- u. Jagdw.* 55: 321-331. 1923.—The author discusses the desirability of developing pure local strains of tree species suitable for use with natural regeneration methods, such as those practised in the Barenthoren continuous forest. Promiscuous crossing in stands where no distinct race exists makes itself evident even among the resultant seedling crop, and indicates that definite heritable characters are the chief reason for the wide variations found. The continuous forest idea will remain a myth without the development of pure races.—In the years 1921, 1922, and 1923, the author tested seed of numerous oaks (both *Q. sessiliflora* and *Q. pedunculata*) under nursery and greenhouse conditions, and found much variation even in seed from the same trees, mostly due to pathological factors. Evidently normal Mendelian results are possible only with pure self-pollination or cross-pollination, 2 conditions rarely existing in the local mixed oak stands. Frost and wind are the most important atmospheric factors affecting pollination. Artificial pollination experiments would enable the practitioner to determine whether he is dealing with bastards or mutants in individual cases, and whether it is possible to develop distinct crosses by natural means in mixed stands. The following important factors must be considered in the selection of future oak mother trees: the development of lammas shoots, a distinguishing characteristic of *Q. pedunculata*; the occurrence of "Schleimfluss" (a symbiosis of *Endomyces Magnustii*, *Sacharomyces Ludwigii*, *Leuconostoc Lagerheimii*, and often *Micrococcus dendroporthos*), which attacks the stem, and in the combatting of which the character of the bark is of prime importance; insects; frost and drought damage; and breakage caused by snow and hoarfrost. *Q. sessiliflora* appears to be more capable of uninterrupted development than *Q. pedunculata*. To retain and produce the best mother trees and to remove the undesirables involves careful, individual selection.—*J. Roesser.*

269. SIEGL, LEOPOLD. *Forstbenutzung und Forstkultur im Gemeindewalde Nordtirols* [Forest utilization and culture in the common forest of North Tyrol.] *Wiener Allg. Forst- u. Jagdzeitg.* 42: 39-40. 1924.—Before the war, the forests of the north Tyrol highlands were practically unmanaged, understocked, uneven, frequently overmature and decadent, and were little utilized. During the war small mills came in and also many clearings were made to furnish range for livestock. After the war, financial conditions prevented purchases of timber in outside markets and heavy cuttings were made, particularly for use in hydro-electric development. These forests are now at a critical point. Unless they are to deteriorate further, a light selection system is imperative, with effective protection, including the elimination of grazing.—*F. S. Baker.*

270. SONDEREGGER, V. H. *Report of Forestry Division.* Reprint from Rept. Div. Forest. Louisiana 1920-1922: (1-23). Dept. Conserv.: New Orleans, 1920-1922.—A system of ranger organization, fire guards, and cooperative fire patrol was put into effect in 1921. Excellent results have come from the work with the Boy Scouts and boys' forestry clubs. The department employs an instructor of forestry whose work lies with the public schools and women's clubs. Experimental work is carried on in connection with the Urania Forest Reserve, the U. S. A. Exp. Sta. at New Orleans, and the Great Southern Lumber Co. at Bogalusa.—*A. M. Taylor.*

271. SOYKA, WOLFGANG. *Das Vorkommen der Edellaubhölzer in östlichen Wienerwald.* [The occurrence of high-grade hardwoods in the eastern Vienna forest.] *Wiener Allg. Forst- u. Jagdzeitg.* 41: 243-244. 1923.—The management of the Vienna forest during the past century is outlined with particular reference to the deterioration of the oak stands.—*F. S. Baker.*

272. STERNHART, JOSEF. Winke zur Ausführung von Forstkulturarbeiten im Hochgebirgswalde. [Methods of forest culture in high mountain forests.] Wiener Allg. Forst- u. Jagdzeitg. 42: 81-82. 1924.—Artificial forests at high elevations are a rather recent development. The 1st of them, in Karinthia, dates from about 1850. The present heavy demand for wood is leading to cutting of low grade forests at high elevations, and planting is becoming more and more necessary. Seed-sowing at these altitudes is practically hopeless, while planting is fairly successful. The nursery practice differs from the usual practice chiefly in the length of time the plants are held in the beds (up to 7 years), and in the care that must be taken to discard poor trees. Only the most thrifty are reserved for field planting. The trees are not spaced regularly, but are placed where sheltered by stumps and other similar objects. Plantations develop well, under normal weather conditions.—*F. S. Baker.*

273. SWART. Fortschritt oder Stillstand. [Progress or stagnation.] Zeitschr. Forst- u. Jagdw. 55: 415-421. 1923.—This is a plea for certain changes in forest organization and administration in Germany.—*J. Roeser.*

274. TIREMAN, H. A. ET AL. Admin. Rept. Forest. Dept. Madras Presidency for the year ending 31st March 1923. 95 + LXV + 11 p. Madras, 1924.—Little progress was made in forest working plans. Fire protection was 89.3% successful, but forest offences increased. Protective burning was done on more than 2000 square miles. The cut of timber increased to 131,225 tons, and of fuel to 325,566 tons. Some sowing and planting and cultural operations were carried on. Panchayat management of forests was extended. The year shows a net revenue of lakhs 4.84.—*S. B. Show.*

275. TRESCKOW, VON. Forstwirtschaftlicher Rückblick auf das Jahr 1922. [Review of forestry during 1922.] Zeitschr. Forst- u. Jagdw. 55: 385-404. 1923.—The conditions relating to and affecting forestry are reviewed under the following headings: The general economic situation; the condition of the building industry; the course of lumber prices; the situation in the principal countries supplying Germany with wood (the report of Prof. METZGER of Helsingfors is reproduced); the foreign wood trade in 1922; wood deliveries as reparations to the allied countries; laws and organization; and silvicultural topics. The death of Dr. Möller was of far-reaching importance to the silvicultural development of North Germany, for he stood in the front rank of scientific foresters. The author believes that Germany needs to increase forest production by a more intensive development of silviculture. Too much emphasis has been laid in the past upon the mathematical side.—*J. Roeser.*

276. TUBEUF, VON. [Rev. of: HESS, E. Waldstudien im Oberhasli (Berner Oberland.) (Forest studies in Oberhasli.) Rascher & Co.: Zurich, 1923.] Forstwiss. Centralbl. 46: 121-122. 1924.

277. VAN DEN BUSSCHE, C. Enkele mededeelingen over het looistofvraagstuk. [Notes on tanning materials.] Tectona 12³: 217-252. 1919.—The present status of the tanning industry in the Dutch East Indies, particularly Java, is described. About 1,400,000 pounds of bark are harvested annually in Java, principally pilang, trenggoeli, and weroe. Available data on the tannin content of these and other barks are presented. It is stated that there is little prospect of increasing the local supply of tanning materials in the near future. Attempts to cultivate tannin species date from 1905, using pilang, trenggoeli, kemlandingan (*Leucaena glauca*), djoho (*Terminalia belerica* var. *laurinoides*), and sogo. Results were unsatisfactory for various reasons. Slightly better success was had with natural regeneration. The introduction of exotics of high tannin content is discussed, especially eucalypts, acacias, and Indian species of *Terminalia* and *Cassia*. The 28 native species of *Quercus* and *Castanea*, some of which are known to compare favorably with European species in tannin content, should be investigated, though, because of their location, it is at present difficult to obtain oak bark in commercial quantity.—*W. N. Sparhawk.*

278. WILHELM, AMBROS. Die wirtschaftliche Bedeutung der Waldensamenprovenienz. [The economic importance of heredity in forest seed.] Wiener Allg. Forst- u. Jagdzeitg. 42: 25-26. 1924.—This is a plea for the collection of local seed for use in artificial reforestation, particularly in the region devastated by nun moths during recent years. Cieslar's investigations furnish the scientific basis of the plea.—*F. S. Baker.*

279. WOLFF, MAX. Über Nebenwirtspflanzen der Forleule. [Secondary host plants of the pine moth.] Deutsch. Forstzeitg. 39: 739-740. 1924.—While usually confining their attack to *Pinus silvestris* in normal years, during epidemics the caterpillars of *Noctua piniperda* eat the foliage of other trees, including *P. strobus*, birch, willow, oak, juniper, and spruce, as well as bracken and certain grasses. Defoliation of *Abies pectinata*, hitherto supposed to be immune, has recently been noted. Both *Abies* and *P. strobus* are eaten in preference to spruce.—W. N. Sparhawk.

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 25, 39, 47, 54, 67, 68, 71, 118, 128, 141, 177, 184, 268, 278, 382, 402, 445, 466, 483, 516, 549, 588, 589, 844, 956)

280. BELLING, J. The distribution of chromosomes in the pollen-grains of a triploid hyacinth. Amer. Nat. 58: 440-446. 1924.—The pollen grains of a diploid (or double diploid) clone of hyacinth showed 4, long V-shaped chromosomes of approximately equal size, each with a constriction at the center, 2 medium J-shaped chromosomes apparently identical in size and shape, and having a subterminal constriction, and 2 short chromosomes which appeared similar to each other and usually showed a subterminal constriction. The presence of a number of pairs of chromosomes, the members of each pair being apparently identical, is characteristic of the pollen of tetraploid plants. In the metaphase 1st division in the pollen grains of the triploid hyacinth clone, "Lady Derby," the numbers of chromosomes ranged from 8 to 14 and belonged to the same 3 size classes as those of the diploid clone. The distribution of the extra chromosomes in the pollen of the triploid which were in excess of the numbers in the diploid was according to the laws of chance, after allowing for a source of slight error.—Dorothy I. Neff.

281. BLACKBURN, K. B. The cytological aspects of the determination of sex in the dioecious forms of *Lychnis*. British Jour. Exp. Biol. 1: 413-430. 2 pl. 1924.—The fixative was chloroform-acetic-alcohol. *Lychnis dioica* (red-flowered) and *Lychnis alba* were mainly examined. The diploid number of chromosomes was 24. All the chromosomes were arranged end to end in the prophase. Two of them were larger than the other 11 pairs. In the staminate plant, 1 of these large chromosomes was larger than the other, and of different shape. In the pistillate plant, the large pair was formed of chromosomes each as large as the smaller of the pair in the staminate plant.—John Belling.

282. BOEDIJN, K. Die systematische Gruppierung der Arten von *Oenothera*. [The systematic grouping of *Oenothera* species.] Zeitschr. Indukt. Abstamm. -u. Vererb. 32: 354-362. 1924.—Fertility and quantity of pollen were used as a basis for determining the relationships of species. *Onagra* is related to *Euoenothera* through large-flowered species with homogeneous pollen. *O. Lamarckiana* has arisen from an *O. Lamarckiana blandina*-like type. *O. biennis* and its closest relatives are to be regarded as derivatives of large-flowered species of *Onagra*. If *O. biennis* is younger than *O. Lamarckiana* it has also inherited its peculiar mutability from the latter. The conception of this relationship also destroys the hypothesis regarding *O. Lamarckiana* as a hybrid of *O. biennis*. Descriptions are added of 4 new species: *O. germanica*, *O. Bauri*, *O. furca*, *O. disjuncta*.—Helen D. Hill.

283. BROŽEK, ARTUR. On the inheritance of paracorolla in the full-blossomed race *Mimulus tigrinoides*. Věstník Sjezdu Československých Bot. Praze 1: 90-92. 1923.—This is an abstract of a paper delivered before 1st Congr. Czechoslovak botanists, Prague.—In 1914 certain races of *Mimulus tigrinoides* were observed, which possessed blossoms with petaloid excrecences filling the tube and reaching partly out of the blossom. By self-fertilization and selection pure lines with these full blossoms were developed. To test the inheritance of this paracorolla, *M. tigrinoides* with full blossoms was crossed with *M. quinquevulnerus rubinus* having plain blossoms. The plain blossom was dominant in all 314 plants of F_1 . Self-fertilization of the F_1 plants gave in F_2 the ratio of 2 full: 7 plain: 13 plain and full. The theoretical

constitution of the parent plants is given and the ratio of 2:7:13 is considered within the limits of error of the theoretical ratio of 1:7:8. Further experiments are to be carried on to test the accuracy of these results.—*Charlotte Elliott.*

284. BRUNSWIK, H. Experimentelle Untersuchungen über die Sexualität der Basidiomycetengattung *Coprinus*. [Experimental investigations on sexuality in the Basidiomycete genus *Coprinus*.] Zeitschr. Indukt. Abstamm. -u. Vererb. 33: 257-258. 1924.—It was found that *Coprinus narcoticus* and *C. sterquilinus* and probably also *C. ephemerus* and *C. ephemeroides* are homothallic. Heterothallic species are of 2 types: (1) *C. papillatus* which has in the same fruiting body 2 kinds of mycelia; the mycelia, however, from different fruiting bodies are not alike, and the sexuality can not be represented by a simple + and - scheme; (2) *C. stercorearius*, *C. niveus* and *C. lagopus*, which have in the same fruiting body 4 genetically different kinds of mycelia. This agrees with the findings of Kniep for *Aleurodiscus* and *Schizophyllum*. In *C. stercorearius* there were found 23 strains having different allelomorphs of A and B factors (A_1B_1 — $A_{23}B_{23}$) which determine the possibility for fusion of gametes. In that species, therefore, 529 genetically different haploid mycelia are possible.—During the investigations, 3 cases were observed in which the fruiting bodies were the result of fusion of 3 mycelia.—The author thinks that the sexuality in fungi is progressing in the following direction: homothallic species—homothallic species with 1 factor for sterility, and homothallic species with 2 factors for sterility.—*M. Demerec.*

285. CASTLE, W. E. Continuation of experimental studies of heredity in small mammals. Carnegie Inst. Washington Year Book 22: 279. 1924.—A progress report on studies of linkage relations of genes of mammals is given.—*B. E. Livingston.*

286. CHAMBERS, ROBERT. A note on the entrance of the spermatozoon into the starfish egg. Proc. Soc. Exp. Biol. and Med. 20: 137-138. 1922.—Experiments were carried on by the author, which confirmed Fol's observations on the entrance of the spermatozoon into the egg of the starfish at fertilization. Fol, however, failed to observe that from the tip of each cone which forms on the surface of the egg, a slender filament grows outward, piercing the zone of jelly surrounding the egg, until it reaches the periphery where the trapped spermatozoa are lying. If the tip of the filament comes into contact with a spermatozoon the cytoplasm of the tip and that of the sperm head immediately flow together so that the sperm nucleus lies within the cytoplasm of the egg filament. This filament, simultaneously with all the other filaments, then begins to draw back into the egg, dragging the spermatozoon along with it. The spermatozoon acts like an unwilling victim and occasionally frees itself if other filaments have secured spermatozoa and are slightly ahead in action. The base of the cone becomes concave instead of convex and by the time the sperm head reaches the summit of the cone, the lifting of the egg membrane has spread from the base of the cone over the egg and is recognized as the fertilization membrane. The head of the spermatozoon is drawn inside the cone by the filament and as the cone recedes into the egg the strand extending to the tail outside the fertilization membrane breaks—only then does the tail cease its motion.—*Dorothy I. Neff.*

287. CHAMPY, CH. À propos des caractères sexuels des Anoures. [The sexual characters of Anoura.] Compt. Rend. Soc. Biol. 90: 838-840. 1924.—A case of hermaphroditism of *Rana temporaria* is discussed.—*Oran Raber.*

288. COLLINS, E. J. Inheritance of the colour pattern of King Edward potato. Jour. Genetics 14: 201-202. 1924.—The tuber of the King Edward potato is splashed with pink, the coloration being more or less confined to the eyes and to areas varying in size around the eyes. King Edward produces no viable pollen. King Edward ♀ × Majestic ♂ (regarded as a homozygous recessive white) gave F_1 seedlings which with respect to tuber color were in a ratio of 1 white: 1 colored like the ♀ King Edward parent. A seedling with tubers like the King Edward parent was crossed with Majestic and the offspring gave approximately a 1:1 ratio as regards pigment distribution. The author thinks this parti-colored pattern depends on a definite factor and that it exists in the variety King Edward in a heterozygous condition. If homozygous, it should behave as a dominant to recessive white and be recessive to full color, thus providing a multiple allelomorphic series.—*Dorothy I. Neff.*

289. CUÉNOT, L., R. LIENHART, AND P. VENIER. Sur la transmissibilité d'un caractère somatique acquis (cataracte de Lapins). [The transmissibility of a somatic acquired character, the cataract of the rabbit.] *Compt. Rend. Acad. Sci. Paris* 178: 1129-1132. 1924.—The authors have made an attempt to verify the results obtained by Guyer and Smith on the inheritance of acquired characters. Pregnant rabbits which were intoxicated with naphthalene became blind with cataracts and produced young having the same defect. By crossing blind litter mates, 24 normal young were obtained. A rabbit suspected to be infected with *Treponema cuniculi* had an eye defect similar to that produced by naphthalene and the authors suggest that some of Guyer's and Smith's results might be due to infection with the same organism.—H. C. McPhee.

290. DAVENPORT, C. B. Department of Genetics, reports on current investigations. Carnegie Inst. Washington Year Book 22: 87-125. 1924.—The main topics are: Interchromosomal mutation, evolution of the germ plasm, experimental modification of the germ plasm, control of the sex ratio, germinal and somatic variations, inheritance of special traits, human genetics, genetic constitution of the American population, physiology of reproduction and development, other investigations, and administrative record.—B. E. Livingston.

291. DAVENPORT, C. B. Interchromosomal mutation. Carnegie Inst. Washington Year Book 22: 88-96. 2 fig. 1924.—Five or 6 of the primary 25-chromosome *Daturas* have varieties (secondaries) each of which somewhat resembles its primary, and throws a small percentage of the primary. One primary and its secondary have been shown to give triploid or trisomic ratios for the same factor pair. The primaries regularly occur in the offspring of triploids. The difference between primaries and secondaries is not due to a Mendelian factor pair. One primary gave triploid ratios for a character pair, while its secondary showed diploid ratios. The extra chromosome in this secondary may be deficient in part.—Strains of diploids, which will start completely homozygous, are being raised from a haploid ancestor. Haploids have been proved to arise by parthenogenesis from diploids, and diploids have arisen in the same way from tetraploids.—A pentasomic ratio for flower color has been obtained from a $4n + 1$ plant. Four diploids have been found with a different branch, which has, in 2 cases, borne $2n - 1$ pollen-mother-cells. Another differing plant, with sterile flowers, had all pollen-mother-cells with $2n - 1$ chromosomes. Three other diploid plants bore a branch whose pollen and seeds were tetraploid.—Pollen-tubes from diploid plants gave a unimodal curve with regard to rapidity of growth in the style. Pollen-tubes from some 25-chromosome plants gave a bimodal curve, while those from others seemed to give trimodal curves.—*Daturas* with $3n - 1$ and with $3n + 1$ chromosomes, a triploid hyacinth, and triploid *Hemerocallis fulva*, gave nearly a chance distribution of the extra chromosomes in their pollen-mother-cells or pollen-grains.—True tetraploid *Daturas*, pseudo-tetraploids with 1 set of 3 and 1 set of 5 chromosomes, pseudo-tetraploids with 2 sets of 3 and 2 sets of 5 chromosomes, and $4n - 1$ *Daturas*, gave usually fewer 46, 47, 49, or 50-chromosome plants in their offspring than would occur if all the egg-cells, but only the 24-chromosome pollen, were functional. The distribution of chromosomes in the pollen-mother-cells came near to that calculated for one case of non-disjunction in 36 potential disjunctions in each quadrivalent. In the progeny of $1 \times 4n + 2$ *Datura*, the numbers of 48, 49, 50, and 51-chromosome plants showed that some pollen with more than 24 chromosomes was functional.—John Belling.

292. DOVER, CEDRIC. Mendelism and evolution. *Nature* 113: 712. 1924.—Reference is made to Regan's comment (*Nature*, Apr. 19) on the work of Annandale.—O. A. Stevens.

293. EAST, E. M. Mankind at the cross roads. *viii + 360 p.* Chas. Scribner's Sons: New York, 1923.—The author's experience in such fields as food chemistry, dietetics, agricultural economics, and plant breeding, leads him "to the definite conclusion that the world confronts the fulfilment of the Malthusian prediction here and now. Man stands today at the parting of the ways, with the choice of controlling his own destiny or of being tossed about until the end of time by the blind forces of the environment in which he finds himself." The supposed vast extent of undeveloped land is largely imaginary: the best is already under cultivation and reaching the point of diminishing returns. What remains is for the most part of inferior quality, or worthless. The tropics offer hope of only a temporary solution. It is a foolish "optimism" that relies on the saving grace of human ingenuity to find a way out

when actual famine is at hand. It may be predicted that, with the present heretofore unparalleled increase in population throughout the whole world, the point of saturation will be reached in a very few generations. Every country then will be forced to exclude immigrants and prohibit exports. Wars will be only temporary palliatives. The one obvious, and only apparent solution would seem to be some plan of population restriction, begun before it is too late. The author advocates inauguration of a general policy of birth control that will hold the human race numerically within limits that can be comfortably maintained by the earth's resources.—*C. H. Danforth.*

294. ENGLEADOW, F. L. Inheritance in barley. III. The awn and lateral floret (cont'd.): fluctuation: a linkage: multiple allelomorphs. *Jour. Genetics* 14: 49-87. 8 fig. 1924.—Pure line seed from each of 12 good plants of forms of *inermis* barley was divided at random into 3 parts and $\frac{1}{2}$ planted Oct. 7, 1920, $\frac{1}{3}$, March 15, 1921, and the last $\frac{1}{3}$, April 15, 1921. The 1st set was completely awnless, while sets 2 and 3 had awns of varying length. The experiment was repeated the following year with similar results except that some late tillers of the fall sowing developed short awns. "It is concluded that the so-called 'awnless' barleys are very prone to fluctuation."—*H. hexastichum* rarely displays fluctuation in the lateral floret, while *H. intermedium* is outstanding in such fluctuations, *H. distichum* shows minor differences in this respect and *H. decipiens* forms are marked by singular constancy of lateral floret form.—From studies upon ear-width fluctuations the conclusion is reached that "distinctions based upon small shape differences are consequently, in most instances, of no value" because the shape of the ear changes with the development of the grain.—From a study of a cross of *H. hexastichum* \times *inermis*, "it is concluded that the characters 'six-row' and 'full-awns' are governed by separate but highly-linked factors." A summary of the genetic relationship of the awn and the lateral floret in the main groups of *H. sativum* is given. The multiple allelomorphism of the lateral floret forms of the 4 main groups of *H. sativum* which at first was believed to be a simple phenomenon, appears from later evidence to be a complex one.—*J. A. Faris.*

295. FISHBERG, MAURICE. Inter-marriage between Jews and Christians. 2nd. Internat. Congr. Eugenics, Vol. II, Eugenics in Race and State. P. 125-133. Williams & Wilkins Co.: Baltimore, 1923.—Inter-marriage between Jews and Christians has been increasing in all countries for the past 50 years. Marriage statistics for Germany and Scandinavia are cited as evidence. Reasons for this change from the traditional endogamy of the Jews are chiefly: (1) partial abandonment by the Jewish minority of the religious and social rules which constituted the chief bar to out-marriage; (2) repeal of laws prohibiting marriage of Jews and Christians. The conditions favoring inter-marriage of Jews and Christians are considered—immigration of Jews into democratic countries; isolation of Jewish minorities as in rural districts; "Success for a Jew in any line of human endeavor . . . means that his descendants will be lost within 2 or 3 generations through inter-marriage with Christians." The increase of inter-marriage does not create any new problem in race mixture since elements of nearly all races have already entered into the constitution of the Jews. A list of notable persons descended from crosses of Jews and Christians is cited in support of the contention that progeny of such mixed marriages is apt to be superior.—*L. C. Dunn.*

296. FISHER, R. A. The Darwinian theory. *Sci. Prog.* 18: 466-467. 1924.—Fisher continues his discussion with MacBride as to the evolutionary significance of Mendelian characters and the method of applying statistics to biological problems. MacBride's reply follows.—*Edgar Anderson.*

297. FROEHLICH, R. E. Über Flocculus-Bildungen der menschlichen Iris und ihre Vererbung. [Flocculus formations of the human iris and their inheritance.] *Arch. Rass. -u. Gesellschaftsbiol.* 15: 249-262. 7 fig. 1924.—Flocculi of the iris occur normally in the horse where they appear as irregular projections of the pupillary border—larger above, smaller below, absent on the sides. In many mammals they are rare or absent. In man they are uncommon, as shown by a review of the literature from 1833 to date. They have been regarded as atavistic, but such study as the available material would permit indicates that the homologies of the human form must be regarded as still unproved. In 26 cases (Vogt) only 1 was a ♀, and among 13 new cases from the Basle clinic there were only 2 women. Seven

family histories are presented, the analysis of which leads to the conclusion that the trait is not a single, sex-linked character, since an affected mother may have normal sons. Possibly it is due to multiple factors, at least 1 of which is sex-linked.—*C. H. Danforth.*

298. GATES, R. RUGGLES. A peculiar type of variability in plants. *Jour. Genetics* 13: 13-45. 24 fig. 1923.—The author further analyzes the data on F_1 , F_2 , and F_3 populations of *Oenothera rubricalyx* \times *biennis* reciprocals as regards inheritance of petal size 1st described in 1917, and adds some F_4 data. The F_1 is intermediate and quite uniform; the F_2 and F_3 show wide segregation including the parental range with some flowers less than $\frac{1}{2}$ those of *O. biennis*. Segregation may be continuous or discontinuous for the same plant. In F_4 the variability is considerably reduced. Two F_4 families tend to breed true to conditions for parent plant except for the occasional segregation of plants or flowers with smaller petals. Gates thinks that variations of this type lie between Mendelian inheritance and fluctuations. "While fixed units can hardly be present, yet definite units subject to a sliding scale of quantitative variation are probably involved." He concludes that it is "evident that the whole problem of inheritance of cumulative size factors needs reëxamination" and that variations of this type are due to disharmony between size characters from the 2 parents. The tendency of slitting of petals is also thought to be correlated with "difficulties of adjustment between forms with large and small petals."—*Margaret C. Mann.*

299. GILLOT, P. Remarques sur le déterminisme du sexe chez *Mercurialis annua* L. [Remarks on the determination of sex in *Mercurialis annua*.] *Compt. Rend. Acad. Sci. Paris* 178: 1995-1998. 1924.—The work of previous investigators on this subject is brought into question on account of the irregularity and capriciousness of germination. Table I shows percentages of germination of seeds collected in 1913, 1914, and yearly from 1919 to 1923 inclusive. These seeds were planted at once, and also in successive years. For example, those collected in August 1919 gave 14% germination at once, 60% in 1920, 55% in 1921, 60% in 1922, and 52% in 1923. Table II shows the results of the sowing of 4000 seeds on March 20, 1920. From these, 3052 individuals were secured of which the ratio of males to females was 107:100. The ratio was also kept for collections made during June, July, September, and October 1920, and for 1921, 1922, and 1923. These ratios are as follows: 129, 108, 11, 84, 89, 105, 91:100. It is thus concluded that the predominance of 1 sex over the other varies with the time of collecting the material. Furthermore, the sex ratios obtained do not correspond to the real sex ratios, since not all of the seeds germinate and develop.—*C. H. Farr.*

300. GOODACRE, W. A. The queen bee competition at Wauchope. A non-swarming test. *Agric. Gaz. New South Wales* 35: 437-438. 1924.—It is necessary to combine a good system of management with selection in breeding in the prevention of swarming. Six men competed in the non-swarming contest upon which notes are given.—*L. R. Waldron.*

301. GOWEN, J. W. The inheritance of milk production. *Sci. Agric. La Revue Agron. Canadienne* 4: 365-380. 1924.—The writer has shown by an intensive study of Jersey and Holstein-Friesian records that inbreeding, relationship, and the occurrence of famous sires have little if any effect on the production of the progeny of dairy sires. Registration of animals is of value because it shows that efforts have been made to make such animals pure for certain types of production. In reading a pedigree the greatest importance should be placed on the performance of dam, full sisters, and $\frac{1}{2}$ sisters. Noted ancestors which occur more than 4 generations from the dam are of minor importance because their influence has become too much diluted.—*H. C. McPhee.*

302. HARLAND, S. C. Inbreeding in cotton and its importance to the plant breeder. *Agric. Jour. India* 18: 465-474. 1923.—The author discusses inbreeding results of other workers in cotton in the light of recent genetic investigations. As to inbreeding in cotton where the alleged results were a reduction in fertility as measured by the ability of selfed plants to set bolls (LEAKE, H. M., AND RAM PRASAD. Notes on incidents and effect of sterility and cross fertilization in Indian cottons. *Mem. Dept. Agric. India Bot. Ser.* 4: 37-72. 1912.), the author points out (1) that the results are not statistically significant, (2) that the neglect of the environmental causes of shedding preclude the data from being accepted for critical purposes.—Characters such as partial degrees of "male sterility" and complete "male sterility" in cotton which at first was believed by Leake and Ram Prasad to

result from inbreeding, the author ascribes as due to the segregation of genetic factors. The results of other workers show that sterility both partial and complete is found also in commercial pollinated varieties.—Further, inbreeding has not caused a diminution in fertility as measured by the percentage of ovules set. "On the contrary" the author states, "it is clear that inbreeding may result in the isolation of types more resistant to shedding than the commercial ancestors."—The author cites the fact that cotton when homozygous is analogous to homozygous lines of maize or other crops.—"Inbred lines of cotton are in no way distinguishable from commercial stocks except in a reduction of general vigor which is slight and of little consequence to those engaged in cotton breeding."—*G. N. Stroman.*

303. HARRIS, J. ARTHUR. The correlation between monthly and annual egg production in the pullet year in the White Wyandotte fowl. *Poultry Sci.* 1: 196-202. 1922.—Correlation coefficients between monthly and annual egg records calculated on 670 White Wyandottes tested at Storrs, Connecticut, are reported. The regression of annual on monthly production is calculated. Regression straight lines are found to be reasonably safe guides in predicting future production from past performance.—*F. A. Hays.*

304. HARRIS, J. ARTHUR, AND HARRY R. LEWIS. The correlation between the monthly record of the first year and the annual record of the second year, with special reference to culling for second year production. *Poultry Sci.* 1: 145-150. 1922.—First and 2nd-year egg records made by 443 White Leghorn birds were studied to determine the accuracy of future prediction based on past performance. The birds were divided into 4 classes of producers in such a way as to place approximately equal numbers of individuals in each class. Such a classification is made for each month of the year. It was found that in all cases both the 1st and 2nd-year egg record ranked in the same order as did monthly production for the 4 quarters of the flock. Culling for 2nd year performance on monthly production during the 1st year was found to be a dependable procedure.—*F. A. Hays.*

305. HARRISON, J. W. H. Sex in the Salicaceae and its modification by Eriophyid mites and other influences. *British Jour. Exp. Biol.* 1: 445-472. 1924.—Sex ratios in diploid willows show a slight preponderance of ♀'s which, when significant, is probably due to slower pollen tube growth of xy gametes. In tetraploids the ♀ preponderance is much greater. This excess is explained by several factors: (1) differential pollen tube growth, (2) occurrence of the lytokous apomixis, (3) false fertilization stimulating the lytokous apomixis, and (4) circumstances arising out of peculiar sex chromosome complexes of polyploids. In diploid hybrids, sexes appear to be about equal but hybrids with 1 or more polyploid parents always have excess of ♀'s. Androgynous forms are males transformed by metabolic changes induced by environmental influences. Androgyny is another sign of upset sex balance resulting from hybridity. The metamorphic varieties are all pure species of the section *Capreae*. The condition is caused by local metabolic changes induced by parasitic castration by Eriophyid mites.—*Margaret C. Mann.*

306. HAYES, H. K., AND ALEXANDER LEE. Methods of corn breeding. *Minnesota Agric. Exp. Sta. Bull.* 210. 1-22. 1924.—A test of several methods of ear selection on the improvement of the yield of corn shows that "an adapted variety of corn can be kept in a constant state of improvement by selection on the basis of vigor without close selection for score card ear type." Tests of 1st-generation crosses indicate that the use of such crosses between standard varieties will not lead to material increase in yield but a cross between an early flint and a later dent appears of promise for northern Minnesota.—*J. H. Kempton.*

307. HAYES, H. K., E. C. STAKMAN, FRED GRIFFEE, AND J. J. CHRISTENSEN. Reaction of barley varieties to *Helminthosporium sativum*. Part I. Varietal resistance. Part II. Inheritance studies in a cross between *Lion* and *Manchuria*. *Minnesota Agric. Exp. Sta. Tech. Bull.* 21. 1-47. 1923.—Varietal resistance was found to be of utmost importance. Resistance and susceptibility, however, are relative characters and the degree of infection is widely influenced by environmental conditions. A study of the correlated inheritance of rough versus smooth awn, black versus white color, and resistance versus susceptibility was made in a cross between *Lion* and *Manchuria*. Black and white color segregated in a 3:1 ratio with black dominant in F_1 . Rough awns proved dominant to smooth and a ratio of approximately 3 rough to 1 smooth awn was obtained in F_2 . The degree of smoothness of the smooth-

awned segregates appeared to be influenced by modifying factors brought in by the rough-awned parent. Homozygous lines with various degrees of smoothness of the awn were obtained in the F_3 and F_4 generations. Resistance versus susceptibility apparently depends on more than a single factor pair. There was an apparent correlation in inheritance between white color, rough awns and resistance; however, within 124 F_4 lines grown, all combinations of resistance and susceptibility, smooth and rough awn, and black versus white color were obtained.—*H. K. Hayes.*

308. HEILBORN, O. Chromosome numbers and dimensions, species-formation and phylogeny in the genus *Carex*. *Hereditas* 5: 129-216. 1 pl., 22 fig. 1924.—The following numbers of chromosome pairs, in nearly 40 species, are regarded as determined with certainty: 9, 15, 16, 19, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 56. These numbers do not form regular multiples. With some exceptions, the chromosomes of plants with higher numbers are smaller. To measure the chromosomes, the camera drawings were put under a compound microscope magnifying twice at the plane of the eyepiece micrometer. It was thought that in this way a unit of measurement corresponding to $\frac{1}{8}$ th of a micron could be used. The longest chromosome was about $3\frac{1}{2}$ microns, and the shortest measures over $\frac{1}{2}$ a micron. In *Carex pilulifera*, out of 306 chromosomes in 24 pollen-grains, only 4 were rejected as too oblique. In comparing the chromosomes from different pollen-grains, the length of the middle one of the 3 long chromosomes was taken as 100. The mean lengths of the 3 long, the 4 medium and the 2 short, as thus measured, were as 10.1:6.3:3.5. The short chromosomes were thinner than the others.—In *C. panicea*, 408 chromosomes were measured. There were 3 long, 2 medium and 11 short, with the relative lengths, 10.1:5.9:4.0. The small chromosomes were thinner. In *C. ericetorum* there were 1 medium and 15 short chromosomes, with lengths in the ratio of 10:5.5. Many other species showed distinct size differences.—One 2n pollen-grain, 3 cases of non-conjunction, and 2 apparent cases of non-disjunction were found. In 2 species some of the chromosomes occasionally formed quadrivalents. There are appended discussions on (1) chromosome number and systematic position, (2) origin of chromosome numbers, (3) species formation, (4) phylogeny, and (5) age and area of species.—*John Belling.*

309. HEIMANS, J. *Polytrichum piliferum* Schreb., mut. *psilocorys*. *New Phytol.* 23: 150-153. Pl. 2, fig. 1-4. 1924.—A loss-mutation is recorded in *P. piliferum* from Holland. In the mutant the hairy calyptra characteristic of *Polytrichum* is perfectly smooth and exactly similar to that of *Catherinea*. The other characters are similar to the type. It was not possible to bring a 2nd generation to the production of sporogonia.—*I. F. Lewis.*

310. HERIBERT-NILSSON, NILS. Zertationversuche mit Durchtrennung des Griffels bei *Oenothera Lamarckiana*. [Investigation of separation (of gametes) in *Oenothera Lamarckiana* through the severance of styles.] *Hereditas* 4: 177-190. 1923.—In this controversial article the author defends his previous findings [see *Bot. Absts.* 6, Entry 1689] that the comparative abundance in fertilization of red-nerved (*R*) gametes over white-nerved (*r*), is due to a more rapid rate of pollen tube growth of the former, instead of the alternative hypotheses of increased viability of the *R* gametes or the formation of a greater number of them as suggested by Renner [see *Bot. Absts.* 12, Entry 4009]. Evidence of different growth rate was secured from transecting *Oenothera* styles at intervals from 20 to 30 hours after pollination. Early produced capsules gave mainly red-nerved offspring.—The cause of non-appearance of *RR* mature zygotes is held to be due rather to non-union of the *R* gametes than to non-viability of *RR* seed, as advanced by Renner, whose crossing data, when critically examined, indicate a heterozygous condition of the *R* factor, which is probably complex, rather than a homozygous condition, which should be postulated if a definite conclusion is to be drawn relative to the non-viability hypothesis.—*L. R. Waldron.*

311. HUXLEY, J. S. Mendelism and evolution. *Nature* 113: 569-570. 1924.—Apology is offered for misinterpretation of letter by Regan [see this issue, Entry 332]. The futility of attempting to develop evolutionary laws from observation alone, rather than from experimental data, is pointed out and a case in point is that of Annandale's work upon certain invertebrates, where certain evolutionary theories are put forward solely upon observation.—*L. R. Waldron.*

312. HUXLEY, J. S. Mendelism and evolution. *Nature* 113: 822. 1924.—In reply to Dover [see this issue, Entry 292] the author admits an intimate relation between character and environment, but farther than this the method by which the evolutionary relation between character and environment is brought about is the 1 question of importance. A knowledge of this can come about only through experiment. "Correlation is not equivalent to causation."—*L. R. Waldron*.

313. ILTIS, HUGO. Die Mendeljahrhundertfeier in Brünn. [The celebration of Mendel's centenary in Brünn.] *Studia Mendeliana*. P. 389-393. Typos: Brünn, Czechoslovakia, 1923.

314. JONES, D. F. Selective fertilization among the gametes from the same individuals. *Proc. Nation. Acad. Sci. [U. S. A.]* 10: 218-221. 1924.—Self-fertilized F_1 plants of a cross between a pop and a sweet corn showed selective action such that more gametes carrying the dominant factor united than would be the case in random mating. The heterozygous F_1 plants backcrossed with the recessive parent showed no selective action either way the pollinations were made. Backcrossed with the dominant parent there was no selective action when the pollen was alike but the pollen from the heterozygous F_1 plants showed a markedly greater fertilizing ability on the part of the gametes carrying the dominant factor. From this it is concluded that there is apparently an interaction between the pollen tube and the tissues in which it grows, such that pollen carrying the dominant factor is better able to accomplish fertilization than the pollen carrying its recessive allelomorph only in a sporophyte which has the dominant factor either in the haploid or diploid state. There is in this case a tendency among diverse gametes from the same individuals for like to mate with like just as among individuals of different germinal constitution, as has been shown by the results of pollination with mixtures of pollen from different plants.—*J. H. Kempton*.

315. JUST, GUNTHER. Wahrscheinlichkeit und Empirie in der Erblchkeitsstatistik. [Probability and empirical results in genetical statistics.] *Biol. Centralbl.* 42: 65-71. 1922.—The author has used the data on nearly 6000 *Drosophila* individuals to test the distributions of "families" according to percentage of recessives in the family. He finds that the distributions agree very closely with the normal distributions to be expected from the probability theory, both when the large natural families are considered, and when small families of 6 individuals each are made up artificially by taking groups of pupae before eye color, the character under consideration, can be distinguished.—*Sylvia L. Parker*.

316. KIHARA, H., AND T. ONO. Cytological studies on *Rumex* L. II. On the relation of chromosome number and sexes in *Rumex acetosa* L. (English résumé p. 86.) *Bot. Mag. Tokyo* 37: (147)-(149). 1923.—The diploid number of *Rumex acetosa* is 15 in the ♂ and 14 in the ♀. The ♂ always has 1 "tripartite" chromosome ($m_1 + M + m_2$) and 6 bivalent chromosomes in the 1st maturation division. The ♀ has 2 large M chromosomes and 12 autosomes in the somatic cells. The large M chromosomes are considered the X elements, the smaller m_1 and m_2 chromosome parts constitute the Y chromosome of the ♂.—*J. L. Collins*.

317. KÜPPER, M. Folgeerscheinungen der Kastration am tierischen Organismus. [Development following castration in animals.] *Landw. Jahrb. Schweiz.* 37: 409-434. 1923.—The effect of castration upon the development of secondary sexual characters of mammals is illustrated and discussed. In sheep, removal of the sex glands causes the pelvis of the ram to resemble that of the normal ewe, and vice versa. The appearance of thumb pads on frogs was found to be largely controlled by the sex glands. The results of various workers on birds is extensively reviewed and illustrated. The effect of parasitic castration of certain arthropods is illustrated and briefly discussed.—*H. C. McPhee*.

318. LAIBACH, F. Frucht- und Samenbildung bei heterostylen *Linum*-Arten. [Fruit and seed formation in heterostylic *Linum* species.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 33: 267-268. 1924.—Legitimate pollination produces in both long- and short-styled forms complete fruit setting except in 1 race of *Linum perenne* in which legitimate pollination is not regularly successful. Seed formation is dependent somewhat upon nutrient conditions. A favorable position of the inflorescence and a vigorous plant lead to the production of 9 or 10 seed per capsule out of a possible 10, while an unfavorable nutrient condition may result in $\frac{1}{2}$ this number of seed.—Illegitimate pollination always produces fewer seed than legitimate

and the seed are not as good. In general, long-styled forms are more fertile than short-styled, but in *L. grandiflorum* the reverse is true.—Within the same species, races may be obtained which are strongly self-fertile, weakly self-fertile or self-sterile, all of these forms having been isolated in long-styled races of *L. austriacum*. In general, the short-styled forms of *L. austriacum* are self-sterile but 1 self-fertile form has been obtained.—Self-fertile stocks set seed if pollinated with pollen from either self-fertile or self-sterile forms. Self-sterile stocks set no seed when pollinated with pollen from self-fertile forms. From this it is concluded that the difference between self-fertile and self-sterile stocks lies in differences of stylar tissue rather than in differences of pollen. Self-fertility behaves as a dominant character in crosses of self-fertile with self-sterile forms. Long-styled forms appear homozygous for this character while the short-styled forms appear heterozygous. Continued inbreeding results in a reduction in vigor of plants but not in a reduction in degree of fertility. Species crosses between homo- and hetero-styled types have not been successful and between hetero-styled species successful only with legitimate pollination. Seed produced from the cross of *L. perenne* with *L. alpinum* resemble very closely the legitimately produced seed of the mother plants in number, size, weight, and ability to germinate. *L. perenne* × *L. austriacum* produces only incompletely developed seed. The number of seed produced is below normal and the best seed contain poorly developed embryos incapable of germination by themselves. If the testa is removed, however, under careful nourishment the embryo develops into a vigorous plant intermediate in character between the parents. This hybrid is decidedly hetero-styled and completely sterile either with self-pollination or illegitimate foreign pollination. Legitimate pollination gives complete fruit setting and normal seed, and like results follow the legitimate backcross to either parent.—Fruit obtained from the cross, *L. austriacum* × *L. perenne* and its reciprocal, contains many incompletely developed seed light in color and with embryos inhibited in early stages of development. The crosses, *L. alpinum* × *L. austriacum* and *L. hirsutum* × *L. viscosum*, appear similar to those just described.—Fred Griffee.

319. LATHOUWERS, V. *L'amélioration des plantes de la grande culture*. [The improvement of crop plants.] 240 p. Jules Duculot: Gembloux, 1924.—This book is a consideration of the scientific bases, methods, and technique of the breeding of crop plants. It is the 1st volume of the new series of books on agriculture by Belgium scientists. The discussion of crop breeding is presented under 3 main headings,—methods, technique, and the improvement of special crops. In the discussion of methods a brief history of early plant breeding studies is given and a general review of the laws of heredity is made. Methods of improvement are discussed under: mass and individual plant selection, the creation of new races of hybridization, and improvement after mutation. In that part of the book devoted to technique a careful description is given of plant breeding gardens, the methods of taking data and of analyzing results, and the technique of comparative tests and of making crosses. The breeding of important crops such as wheat, barley, oats, rye, maize, sugar beets, potatoes, clovers and grasses is discussed in some detail. Numerous illustrations aid in an understanding of the subject.—H. K. Hayes.

320. LÉCAILLON, A. *Sur les races ou variétés nouvelles que l'on peut obtenir par la méthode des croisements chez le Bombyx du mûrier*. [The new races and varieties which can be obtained by crossing the silk-worm moth.] *Compt. Rend. Acad. Sci. Paris* 178: 2276-2278. 1924.—Crossing different races of *Bombyx mori* and so combining their characters is the most effective method of producing new races. Thus, individuals combining homozygously the characters of several races may be obtained within a few generations. In 1920 a brown ♀ heterozygous for white (namely, brownish, "moricaude") × ♂ striped (rayé, black band on each segment) gave 45 brown and striped, 53 brown, 63 striped, 73 white. Brown and striped, inbred, in 1921, gave 73 brown and striped + 17 brown + 12 striped + 9 white [note the 9:3:3:1 ratio] from which homozygous double dominant brown and striped stock was obtained in 1924 (in 1923 brown and striped threw also brown). In 1923 a [homozygous double dominant] brown and striped ♀ × ♂ brown, recessive for stripes, gave all with brown and stripes. In 1921 a striped ♀, heterozygous for white, × ♂ brown gave brown striped and brown unstriped. In 1922 brown and striped × greenish-yellow gave brown and striped, striped, brown, and [greenish-yellow being recessive] white. Brown and striped of this stock, inbred, gave in

1924 brown and striped, brown, striped, greenish-yellow, and also greenish-yellow brown and striped and greenish-yellow brown. Certain individuals of the 2 last classes had a well-marked rose tint, a distinct supplementary variety. The greenish-yellow brown and striped, when obtained in the homozygous state, will combine the characters of 3 different races. The author holds that the most of these crosses conform to Mendel's laws, but that among the facts here presented very remarkable exceptions to Mendelian phenomena occur.—*J. H. Gerould*.

321. LENZ. [German rev. of: DÜRKEN, BERNHARD. *Allgemeine Abstammungslehre*. (General treatise on the doctrine of descent.) 205 p. Gebrüder Bornträger: Berlin, 1923.] *Arch. Rass.-u. Gesellschaftsbiol.* 15: 420-424. 1924.

322. LENZ, FRITZ. Einige grundsätzliche Bemerkungen zur Fragestellung nach der erblichen Bedingtheit der Schizophrenien. [Some fundamental remarks on the question of the hereditary conditions in schizophrenia.] *Arch. Rass.-u. Gesellschaftsbiol.* 15: 273-279. 1924. —Kahn, in a treatise published in 1923, dealing with schizophrenia and what is designated as schizoid or less marked psychopathic states, postulates the existence of 2 pairs of hereditary factors involved in the production of these conditions. One, assumed to be dominant, produces the schizoid forms, while the simultaneous action of this factor, either homozygous or heterozygous, and a recessive factor, which must be homozygous, produces true schizophrenia. Lenz points out that there is some uncertainty in diagnosis and shows that so far as the data go an adequate explanation would be afforded by the assumption of a single factor which produces schizoid derangement when heterozygous, and schizophrenia when homozygous. Such a factor would appear to be dominant when comparison is made between normals and schizoids, recessive when between schizoids and schizophrenias. In any event Kahn's theory is inconsistent with the distribution of the traits in the whole population and it seems to the author that the single factor hypothesis is preferable.—*C. H. Danforth*.

323. LILIENFELDOWNA, F. A. Badania nad dziedzicznością u gwoździka *Dianthus barbatus* L. Ciąg dalszy. [Inheritance studies in *Dianthus barbatus* L. II.] *Acta Soc. Bot. Poloniae* 2: 15-43. 1 pl., 5 fig. 1924.—The following results, already reported in an earlier paper, were confirmed and extended: (1) Linkage was observed between the *M* and *E* factors; 18 *ME*: 1 *Me* (where *M* is factor for versicolor and *E* the factor for simple flower). There is complete correlation between netting and hairiness. Both characters are the result of a single factor rather than due to complete linkage between 2 factors. There is linkage between hairiness and red "Endfarbe." Linkage also exists between normal growth and violet color of the ring markings, the number of observations, however, is still too small to express the linkage in numbers. The character "Rasenzweig," as well as the red color of its flower is constant.—(2) A *gigas* form was observed in 1 instance when there was factor separation of *M* and *E* in a plant. The genotypic constitution of the plant was *mm Ee*. The progeny from this plant, consisting of 105 individuals, showed in 103 of them the *gigas* character. The *gigas* form differs from the normal plant in being larger, especially in regard to thickness of stem and leaves. Anatomically, the tissues give the impression of pathological hypertrophy. Another noteworthy characteristic of the *gigas* generation is the spiral tendency (*Zwangsdrehung*). Practically all plants show the spiralism, while in the original series only 9.32-14.51% of the individuals develop it. It appears that spiralism does not revert back as is commonly observed, but that it behaves like other characters.—(3) A variety *pulverulenta* was also observed, which behaved much like the *gigas* form. The powdery appearance of the flower was the result of local degeneration of the flask-shaped epithelial cells. (4) A series of chlorophyll races consisted of 5 albino races, 2 chlorotic races, 1 hemi-chlorotic race, 1 chlorina race (plants were pale green and retained that color), and 1 semi-chlorina race. The albino races segregated 3 (typical): 1 (albino); the chlorotic races 3:1 in the monohybrids and 9:7 in the dihybrids; the hemichlorotic forms segregated into 79 (typical): 20 (hemichlorotic): 5 (albino). In the chlorina form as well as in the semi-chlorina form the segregation was 3:1.—*Ernst Artschwager*.

324. LUTZ, FRANK E. Apparently non-selective characters and combinations of characters, including a study of ultraviolet in relation to the flower-visiting habits of insects. *Ann. New York Acad. Sci.* 29: 181-283. 7 pl., 48 fig. 1924.—There are really 3 distinct papers here

but, since each bears upon the same point of biological theory, they are issued as 1. The 1st part deals with the wing-venation of bees. None of the characters studied have any known or even imagined selective value, yet they are so definitely inherited that they or their combinations distinguish large genera. "The details of the wing-venation of bees seem to be much like the figures in a kaleidoscope, definite and doubtless due to some internal mechanism but not serving any special purpose. If natural selection has been active in the evolution of this venation, its activity has doubtless been confined to the destruction of mechanical impossibilities and, in that case, the evidence of its activity is also destroyed. We can not, then, say that natural selection has not played a part in the evolution of the wing-venation of bees, but we can say with considerable confidence that it is not responsible for what we have but, at most, for what we have not."—The 2nd part deals with characters distinguishing different species of stingless bees (*Meliponidæ*). "No life-or-death feature is visible in the particular combinations of these characters that exist today in a family which is so old and so successful that it is distributed throughout the tropics of the whole world, including the Pacific islands."—The 3rd part is of more general interest as it deals with a demonstration by the author and F. K. Richtmyer that ultraviolet is a common floral character and that flower-visiting insects see ultraviolet very well. Discussing the inter-relations of flowers and insects, it is concluded "that floral colors have developed simply as by-products of the plant's metabolism; that at most they are of only incidental and minor service to insects in finding flowers; and that they have not been developed by any action of natural selection." Summarizing, "It is certainly not going too far to change the old expression, 'whatever is is good,' to a more moderate one 'whatever is is not bad.' If we can succeed in bringing ourselves to do this we may expect 'that creatures may possess many totally useless characters,' and we can think of even the colors of flowers in terms of plant physiology instead of solely in the more attractive and exciting terms of advertising and the struggle for existence."—*Author*.

325. MACINNES, L. T. The making of a world's butter-fat record. *Agric. Gaz. New South Wales* 35: 490-511. 7 fig. 1924.—Melba XV of Darbalara, of the milking Shorthorn breed, has recently completed a 365-days official test with a butter-fat record of 1614 pounds, thus surpassing all previous records. The ancestry of Melba XV is summarized by giving records for 6 generations, tracing back along 3 lines, to her foundation sire, to her foundation dam, and to the sire of the foundation dam. Various miscellaneous data are given in regard to the test.—*L. R. Waldron*.

326. MARTIN, R. [German rev. of: BAUR, E., E. FISCHER UND FR. LENZ. *Grundriss der menschlichen Erblchkeitslehre und Rassenhygiene*. Band I: *Menschliche Erblchkeitslehre*. Band II: *Menschliche Auslese und Rassenhygiene*. (Fundamentals of human heredity and race hygiene. Vol. I. Human heredity. Vol. II. Human selection and race hygiene.) J. F. Lehmann: Munich. 1923.] *Arch. Rass.-u. Gesellschaftsbiol.* 15: 322-328. 1924.

327. OEHLKERS, F. Über *Oenotherenkreuzungen*. [*Oenothera crosses*.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 33: 265-266. 1924.—(From author's abstract.) The *sulfurea* form of *O. suaveolens* when crossed with *O. strigosa* and *Lamarckiana* was found to be recessive and homozygous. *Sulfurea* from *biennis* crossed with different dark yellow *biennis* forms gave a *sulfurea* form in 1 case and dark yellow in others. The *albicans* form of *biennis* is active in the ovules while *rubens* is functional mainly in the pollen grains. The *albicans* form of *O. suaveolens* is viable 25% in the ovules while *flavens* functions 75% in the ovules. If the *sulfurea* character is assumed to be strongly linked with these complexes, *albicans* and *rubens*, then the crossing-results fall in line with those of de Vries and Klebahn. Mutants arise from a rare exchange of factors the mechanics of which are unknown.—The form *stringens* arising from *O. strigosa* is assumed to contain a recessive factor, *p*, for pollen sterility. Only *pp* individuals are sterile. Pollen destruction sets in only after its maturation. A detailed account will follow.—*L. R. Waldron*.

328. PEZARD, A., A. SAND, ET F. CARIDROIT. Modifications hormono-sexuelles chez les Gallinacées adultes et théorie de la forme spécifique. [Hormono-sexual modifications of adult Gallinacées and the theory of specific form.] *Compt. Rend. Acad. Sci. Paris* 178: 2011-2013. 2 fig. 1924.—In order to discover if the hormones responsible for the development of the secondary sex characters in the domestic fowl behave in the same way as in the young bird, a

study was made on 5 adult males and 5 adult females of the Leghorn variety. Removal of the gonads in males and females gave a similar result, namely, a small comb with but little vascularization. Transplantation of testicular tissue or ovarian tissue, respectively, to castrated males and females gave a renewal of the secondary sex characters that had been suppressed by castration. An intratesticular ovarian graft in a cock caused the bird to retain the normal ♂ head but to acquire hen feathering. A castrated cock was completely feminized by transplants of ovarian tissue. A castrated ♀ was restored to normal secondary sex characters by ovarian grafts. One normal hen received grafts of testicular tissue. This bird developed ♂ secondary sex characters of the head but retained the ♀ plumage. One hen receiving testicular grafts, after the ovary had been suppressed, developed ♂ like in head and plumage and grew spurs. The term "forme spécifique" is used to include such changes of secondary sex characters as are traceable to the sex hormones.—*F. A. Hays.*

329. PEZARD, A., ET F. CARIDROIT. Remarques au sujet de l'hérédité sex-linked chez les Gallinacés. [Sex-linked heredity in the Gallinaeae.] Compt. Rend. Soc. Biol. 90: 935-936. 1924.—Evidence is brought forward against the chromosome theory of sex-linkage and in favor of the hormone theory.—*Oran Raber.*

330. PORTERFIELD, W. M. Sexual dimorphism and leaf variation in Ginkgo biloba, L. China Jour. Sci. and Arts 2: 255-265. *Illus.* 1924.—There is no correlation between sex and number of lobed leaves and no evidence of sexual dimorphism in regard to shape of tree or manner of branching. There is no correlation between position of leaves on the tree and amount of lobing, for lobed leaves were found as frequent on lower branches as on branches in the upper part of the tree. A positive correlation was found to occur between age of shoot (or tree) and percentage of lobed leaves.—*J. L. Collins.*

331. RAUM, H. Untersuchungen über die Bedeutung morphologischer Eigenschaften der Getreidepflanzen. [Investigations on the morphological significance of characters of cereals.] Zeitschr. Pflanzenzücht. 9: 329-348. 1924.—Results are given for 1 year on a study of number of culms per plant, total plant weight, average culm weight without grain and grain yield per spike or panicle in wheat, oats and barley. In wheat varieties the following species are included: *Triticum monococcum*, *T. dicoccum*, *T. turgidum*, *T. compositum*, *T. durum*, *T. compactum*, *T. polonicum*, *T. spelta*, and *T. vulgare*. In all of these species except *T. polonicum*, *T. compositum* and *T. spelta* both winter and spring varieties were grown. In the species *T. vulgare* both ordinary commercial and improved varieties were grown. The oats varieties are grouped according to color of grain as black, brown or yellow, and white. Barley varieties are grouped under the main headings of 4- and 6-rowed or 2-rowed. In 1st group both winter and spring varieties were grown. The plants were grown 5 cm. apart in lines 20 cm. apart. Only plants surrounded on all sides were used in the study of the characters mentioned. In general, winter varieties of wheat produced more culms per plant than spring varieties. In the species *T. vulgare*, winter varieties also exceeded spring varieties in weight per culm without grain and in yield of grain per spike. The improved varieties of *T. vulgare* produced fewer culms per plant, a higher average culm weight and a higher grain weight per spike than the ordinary commercial varieties. In barley, the winter varieties produced more culms per plant than the spring varieties.—*Fred Griffie.*

332. REGAN, C. TATE. Mendelism and evolution. Nature 113: 569-570. 1924.—The author disclaims either approval or disapproval of the quotation given by him from Johannsen [See Bot. Absts. 13, Entry 7079.] which questions the evolutionary importance of Mendelism. It is no stricture to Mendelian workers that they have not thrown much light upon the long and slow process of evolution. A thorough study of 2 related species should indicate favorable experimental paths leading to further possible knowledge of induced modifications.—*L. R. Waldron.*

333. RENNER, O. Vererbung bei Artbastarden. [Inheritance of species hybrids.] Zeitschr. Indukt. Abstamm.-u. Vererb. 33: 317-347. 1924.—This article is limited to an extensive review of the literature with particular reference to chromosome behavior.—No general rule can be made to apply to species crosses. Among various effects noted in species crosses are certain toxic ones. This effect may be so slight as merely to induce a more luxuriant growth or it may be so severe that no growth results beyond a preliminary stage.—In reciprocal crosses various phenomena are encountered. Chemical differences may exist in reciprocal hybrids

otherwise apparently identical.—In species crosses those characters are usually dominant which are dominant in crosses within the variety.—In certain interspecific *Drosophila* crosses practically identical genes in paired chromosomes may not be allelomorphic.—It is suggested that the phenomena of pollen sterility, in contrast with the more usually fertile ovules, is probably due to the more favorable nutritional environment of the latter during development.—No stable species derived experimentally by crossing, with chromosomes differing in number from the parents, is known to exist. *Oenothera Hookeri*, a true breeding heterozygote is stable to the systematist but splits continually from the genetic standpoint.—Chromosome incongruency perhaps may be a good distinguishing specific criterion.—*L. R. Waldron*.

334. RIERA, JUAN CARLOS. La genetica experimental. Los genetistas suecos. [Experimental genetics. The Swedish geneticists.] Rev. Facul. Agron. y Vet. Buenos Aires 4: 455-462. 1923.—The Swedish geneticists have been active for many years in studying the underlying principles of plant breeding and in developing varieties and types of crop plants adapted to the trying climate of the Scandinavian peninsula. The author briefly considers the work of Bengt Lidfors, Birger Kajanus, Heribert Nilsson, H. Nilsson-Ehle and other Swedish workers who have worked with *Oenothera*, *Salix*, *Triticum*, *Hordeum*, *Vitis*, *Brassica*, *Phleum* and a wide range of other economic plants. Very little genetical work along zoological lines has been carried out in Sweden.—*John O. Stevenson*.

335. ROEMER, TH. Vererbungsstudien mit Lupinen I. [Genetic studies with Lupines I.] Zeitschr. Pflanzenzücht. 9: 271-318. 1924.—The author found that marbled seed are simple Mendelian dominants to self colored, the character being closely linked to the light blue color of the flowers. The greater part of the paper is taken up with data and discussion on somatic segregations or somatic mutations, which it is claimed were frequently found during the investigations.—*M. Demerec*.

336. SACHS-SKALIŃSKA, MARJA. Krzyżowanie ras wielopostaciowych. [Crossing of polymorphous races.] Pamiętnik Zakładu Genetycznego Szkoły Głównej Gospodarstwa Wiejskiego. Zeszyt 1: 34-46. 2 fig. 1921.—The writer describes 2 polymorphic races of *Petunia violacea* Lindl. The variation in color as well as in form of flowers is considerable but limited, and each race has its own characteristic limits of variation. In order to determine whether this polymorphism could be transmitted as an independent factor, *Petunia grandiflora* having uniform red violet flowers was crossed with 2 plants showing the extremes of variability. The plants of the F_1 generation were all like *P. grandiflora*. In the F_2 generation 4 groups appeared,—plants with large uniform flowers, plants with small uniform flowers, plants with large polymorphic flowers and plants with small polymorphic flowers. The results indicate that polymorphism is recessive to uniformity and can be transmitted according to Mendelian laws. The numbers of plants in the 4 groups of F_2 indicate a partial linkage.—*Charlotte Elliott*.

337. SCHAFFNER, J. H. Expression of the sexual state in *Sagittaria latifolia*. Bull. Torrey Bot. Club 51: 103-112. 1924.—Plants of *Sagittaria latifolia* occur having all ♂ flowers, all ♀ flowers, or both in various positions and extent on 1 plant. The transition from carpellate whorl to staminate may be abrupt or gradual. Such facts lead the author to conclude that "sexuality . . . is not primarily a matter of heredity . . . apparently the functional activity which leads to maleness or femaleness under the given environment or at the proper stage in the ontogeny may depend on the properties of a single chromosome in some groups, and in others on a number of chromosomes." The factors determining the sexual state of the individual are, however, thought of as the same as "any other influence which affects the metabolic processes."—*Margaret C. Mann*.

338. SCHMID, CARL. Über Vererbung der vordern axialen Embryonalkatarakt. [The inheritance of anterior axial congenital cataract.] Arch. Rass. -u. Gesellschaftsbiol. 15: 263-269. 10 fig. 1924.—A special form of minute, anterior, axial cataract has been revealed by Vogt as a common congenital anomaly. The diameter is so small (0.1-0.4 mm.) as to cause no real impairment of vision and consequently the cataract is usually entirely overlooked. Its frequency, however, is as high as 20% of the whole population. Among 60 Munich school children, 13 were found to be affected. A study of 10 family histories shows that the condition is definitely hereditary, the distribution of cases in 9 of the families being consistent with the idea that the trait behaves as a simple dominant.—*C. H. Danforth*.

339. SCHMUCKER, THEODOR. Rechts- und linkstendenz bei Pflanzen. [Right and left tendencies in plants.] Beih. Bot. Centralbl. 41: 51-81. 1924.—The author gives a historical sketch of the subject. Specific cases of representatives of all plant groups show a constant tendency either to the right or left, which is frequently used as a species character. Many are discussed in detail. The right or left tendencies have been observed in all groups of plants from bacteria through seed plants, in cilia, leaf spirals, vascular thickenings, flower spirals, cone structures, etc. No causal relations between the respective tendencies and physiology have been determined. No external influences have been discovered adequate to explain the occurrence of these tendencies. Inconclusive discussion of speculative relations is added.—*Helen D. Hill.*

340. SHAMEL, A. D. Bud selection as affecting quantity production. Hawaiian Planters' Rec. 28: 337-342. 1924.—This is a review of recent bud selection studies including those on the potato as reported in Bull. 176 of the Utah Agric. Exp. Sta. on apples as described in Sci. Agric. 2: 120-124, 1921, and on oranges as published in the Jour. Agric. Res. 26: 319-322, 1923. The results of these progeny tests indicate that inherent bud variations of quantity of crop occur in potatoes, apples and oranges, which are capable of perpetuation through bud propagation.—*Author.*

341. SHAMEL, A. D. The improvement of sugar cane through bud selection, report for 1923. 134 p., 5 charts, 39 fig. Exp. Sta. Hawaiian Sugar Planters' Assoc.: Honolulu, 1924.—Notes upon the purpose, plan, location and methods of carrying on bud selection in sugar cane are given. Detailed reports upon the selection of apparently superior stools in commercial fields, details for their isolation and propagation, standards for progeny, stool and stalk selection, forms for recording data and modifications of previous procedure are made. The method of planting progenies "snake fashion" continuously in neighboring rows, has been largely replaced by the method whereby each progeny is given an individual row. The importance of selection to maintain production and secure hardy and disease-resistant strains of existing sugar cane varieties is emphasized. Detailed reports of the methods used and results secured by the field workers upon a number of plantations are included.—*J. A. Faris.*

342. SNOW, R. Counted grain pollinations in *Matthiola*. Amer. Nat. 58: 316-321. 1924.—In making counted grain pollinations, a thin glass needle was swept through the ripe pollen spread thinly on a dry glass slide, the grains taken up by the needle were counted under the microscope and if not too many, were applied to the 2 lateral tufts of stigmatic hairs. The needle was then re-examined to make sure that it had given up all its grains. Destaminated flowers on an eversporting single plant were pollinated with the pollen from pure single and eversporting single plants, to determine if there would be any difference in fertilization between those 2 pollinations, which would help to explain the inheritance of eversporting types. In all, 621 grains of pure single pollen, distributed among 26 ovaries, gave 49 seed, whereas 628 grains of pollen of eversporters, on 27 ovaries of the same ovule-parent, gave 3 seed. Even though the difference was observed, the author feels the necessity of further experiments before drawing a conclusion.—*M. Demerec.*

343. STAPLEDON, R. G. Strains of herbage plants. Reprint from Essex County Farmers' Union Yearbook. 14 p. 1924.—Even when no distinct varieties of forage plants exist, differences are noted between plats sown with seed of different geographic sources. Such differences are due to soil and climate, and to practices of growers. At Aberystwyth a detailed study has been made of indigenous and wild plants taken from hedges and old fields and of commercial seed of the same species. Indigenous forms tend to flower later, have more leaves, tiller more, persist longer, start later in the spring and tend to produce less seed than commercial forms. Farm practices acting upon wild species naturally eliminate the more persistent forms. Notes are given on geographic strains of clovers, alfalfas, and different grasses.—*L. R. Waldron.*

344. VIERHAPPER, F. Neue pflanzenhybriden 4. *Trisetum handelii*. [New plant hybrids 4. *Trisetum handelii*.] Oesterreich. Bot. Zeitschr. 73: 128-129. 1924.—A new species of *Trisetum* was found in East Alps and named *Trisetum Handelii*. It varies from the species previously prescribed in number and length of hairs on the leaf sheath, in length of hairs on

the rachis and callus, in density of growth and in size. It is also sterile. From the standpoint of its morphological differences and its sterility the new species is considered as of hybrid origin. A detailed description is given.—*Fred Griffee.*

345. WALLACE, H. A. Where did dent corn come from? *Wallace's Farmer* 48³³: 3, 8. 1923.—From historical evidence dent corn is assumed to have arisen from crosses between flint and gourdseed varieties.—*J. H. Kempton.*

346. WARREN, ERNEST. A bud-variation in a cultivated *Pelargonium*. *Ann. Natal. Mus.* 5: 45-54. 1923.—From a cutting of a *Pelargonium* in which the flowers were semi-double and the corollas were scarlet, white, white striped with scarlet and variously tinged with pink, two shoots arose, the bases of which were quite continuous with each other at their connection with the cutting. The shoots appeared alike as to their stem and leaf characters but 1 bore only semi-double, variegated, sterile flowers which displayed loss of symmetry in the reproductive organs and corolla, modification of some of the filaments, shortened flower-peduncles and greater pilosity, while the other bore only single, unicolored, scarlet flowers of a perfectly normal type. The cells with the coloration contained anthocyanin and the white areas contained a substance which with certain reagents was capable of being converted into a red pigment. The anthocyanin of the petals was contained in the cell sap of the epidermal cells and these cells were strongly papillose. The cells with a faint tinge of anthocyanin were less papillose, while the epidermal cells of the completely white areas were almost flat. In the ordinary white *Pelargonium* the epidermal cells are as strongly papillose as in a red *Pelargonium*. A portion of the paper is concerned with a discussion of the interpretation of this variation. The author concludes that the appearance of the double flowering plant was probably a mutation and the appearance of the shoot bearing single flowers on the double flowered stock must be regarded as a reversion. He states that "the occurrence of such somatic reversions would seem to demonstrate in a dramatic manner that there is no fundamental difference between germ-cells and soma-cells, such as Weismann postulated, and that the germ-cell is simply a soma-cell which has remained relatively undifferentiated."—*Dorothy I. Neff.*

347. WARREN, ERNEST. A record of two examples of symmetrical abnormalities. *Ann. Natal. Mus.* 5: 73-82. 1923.—The 1st case discussed is 1 of complete absence of fore-limbs on a young duiker. It seems probable that the bud-like outgrowths which normally give rise to fore-limbs were never formed in the embryo. The absence of the fore-limbs was accompanied by certain symmetrical modifications of the scapulae and muscles together with a lowering of the spine. The 2nd case concerns the occurrence of symmetrical horny spurs projecting from both hands of a Zulu. The history of the case indicates that the defect is hereditary and paternal.—*H. C. McPhee.*

348. WHITE, T. H. Some studies in the production of double blooms of stocks (*Matthiola incana annua*). *Maryland Agric. Exp. Sta. Bull.* 259. 87-102. *Illus.* 1923.—Environment, such as growing plants on a bench in rich soil or starving them by cramping roots into pot, was found to have no effect on the production of double blossom. Seed saved from lilac pink selection of seedsman's stock produced no doubles but another selection, peach pink in color, produced doubles varying from 20 to 70%. Seed taken from the peach pink variety, from pods both large and small, all produced double blooms. Individual pods produced different percentages of double blooms but this seemed to bear no relation to the position of the pod on the stalk. When seed that were known to contain a fair percentage of doubles were sown under conditions for equal development the most vigorous growing plants bore the double blooms. There was no increase in the percentage of double blooms from seed that were 5 years old. Five varieties of the "Colossal" type purchased from a seedsman all produced double blooms varying from 56 to 85%. Seven varieties of the "Beauty" type from the same source, varied from no doubles in 1 case to 62% as the highest. It is recommended that in order to improve the seed stock, individual pods should be used and the progeny that shows the largest percentage of doubles should be chosen for further selection. Also, when plants are being grown for cut flower purposes and double blossoms are desired, use only the most vigorous plants.—*Author.*

349. WILSON, EDWIN B. The development of a frequency function and some comments on curve fitting. *Proc. Nation. Acad. Sci. (U. S. A.)* 10: 79-84. 2 fig. 1924.—The author discusses the purpose of curve fitting, and points out that a "simple rough fit may be suggestive

of a working hypothesis which may lead to the discovery of a natural law where a complicated close fit may by its detail obscure." He illustrates by the observed distribution of the number of petals in *Ranunculus*, with 6 different curves fitted to the material.—*Sylvia L. Parker*.

350. WRIEDT, CH. Formalism in breeding of live-stock and modern research on heredity. Internat. Rev. Sci. & Pract. Agric. N. S. 2: 325-331. 1924.—Formalism has had a great influence in determining the coat colors and certain external characters of the breeds of live-stock. Many of the characteristics of show animals have not been shown to have any practical importance and some of the breeds have probably suffered because of excessive selection for these characters. The elimination of recessive hereditary characters not having a practical value is very difficult in practice and the breeder is only rarely justified in the expense of eliminating such characters. It is possible to eliminate entirely all undesirable dominant characters. In breeding animals for utility purposes it is not possible to choose characters which are not of direct or indirect importance.—*H. C. McPhee*.

351. WUTHRICH, E. The selection of cane varieties on scientific lines. Methods for the guidance of planters. South African Sugar Jour. 8: 369, 371, 373, 375, 377, 379. 1924.—The writer asks and answers in detail the following questions: (1) What are we to understand by selection, (2) is selection necessary, and (3) if the answer to (2) is in the affirmative, how can selection be applied most practically?—*Nellie E. Fealy*.

HORTICULTURE

F. C. BRADFORD, *Editor*

(See also in this issue Entries 15, 91, 93, 98, 207, 340, 612, 626, 705, 723, 763, 824, 862, 976)

352. ANONYMOUS. Banana culture in the North. Australian Sugar Jour. 16: 60. 1924.—Like sugar cane, the banana is essentially a tropical plant, and 1 acre of bananas properly worked is worth about 3 acres of sugar cane. Returns come quickly and the production can be maintained all the year round. These arguments are used to encourage banana growing in Queensland, which it is claimed will be successful in competition with the best importations from Fiji.—*Nellie E. Fealy*.

353. ANONYMOUS. Climbing French beans. Jour. Roy. Hort. Soc. 49: 117. 1924.—This is a variety test of climbing French beans which did not do well. Brief notes are given on the best 4 varieties.—*J. S. Bailey*.

354. ANONYMOUS. Dahlia sugar. Sci. Amer. 129: 93. 1923.—This describes a sugar $1\frac{1}{2}$ times as sweet as cane or beet sugar, for diabetics.—*Chas. H. Otis*.

355. ANONYMOUS. Dahlias at Wisley, 1923. Jour. Roy. Hort. Soc. 49: 62-66. 1924.—This is a short summary of a test of 42 varieties of Dahlias. Two points of importance in the cultivation of Dahlias are emphasized: (1) The removal of all flower buds until the plants are well developed and (2) the removal of all dead flowers as soon as the florets fall. A classified list of awards, and descriptive notes are added.—*J. S. Bailey*.

356. ANONYMOUS. Dwarf Tropaeolums at Wisley, 1923. Jour. Roy. Hort. Soc. 49: 97-99. 1924.—This reports a trial of 67 stocks of dwarf tropaeolums, begun in 1922. A list of awards, and descriptive notes are added.—*J. S. Bailey*.

357. ANONYMOUS. Early-flowering Crysanthemums at Wisley, 1923. Jour. Roy. Hort. Soc. 49: 100-114. 1924.—This is a discussion of the trial of 453 stocks including 270 varieties of early-flowering chrysanthemums. A list of the best varieties with notes and descriptions is given.—*J. S. Bailey*.

358. ANONYMOUS. Garden Dahlias. Jour. Roy. Hort. Soc. 49: 50-61. Fig. 15-26 1924.—This is a further elucidation with illustrations of a previous classification of Dahlias given in Jour. Roy. Hort. Soc. 47: 56-73. 1922.—*J. S. Bailey*.

359. ANONYMOUS. Leeks at Wisley 1922-1923. Jour. Roy. Hort. Soc. 48: 236-238. 1923.—Fifty-six stocks of leeks were sent for trial in 1922-1923. A classified list with brief descriptions is given.—*J. K. Shaw*.

360. ANONYMOUS. Perennial Lobelias at Wisley, 1921. Jour. Roy. Hort. Soc. 48: 239-240. 1923.—Twenty-four stocks of lobelias were received for trial in the spring of 1921. A classified list with brief descriptions and notes, and the awards of the committee are given.—*J. K. Shaw.*

361. ANONYMOUS. Phloxes at Wisley, 1922. Jour. Roy. Hort. Soc. 48: 241-257. 1923.—Three hundred and thirty-six stocks of phloxes were sent for trial in the autumn of 1921, all but 1 of the Decussata section. A classified list giving the awards, brief descriptions and notes are given.—*J. K. Shaw.*

362. ANONYMOUS. Runner beans at Wisley, 1923. Jour. Roy. Hort. Soc. 49: 115-117. 1924.—This is a variety test of 42 stocks of runner beans. A list of awards with descriptive notes is included.—*J. S. Bailey.*

363. ANONYMOUS. Salpiglossis at Wisley. 1923. Jour. Roy. Hort. Soc. 49: 67-70. 1924.—This is a description of the method used for forcing Salpiglossis. A list of awards and descriptive notes are also included.—*J. S. Bailey.*

364. ANONYMOUS. Sweet peas at Wisley, 1923. Jour. Roy. Hort. Soc. 49: 71-77. 1924.—This reports a continuation of the trial of sweet peas started in 1921. A list of awards with descriptive notes is given.—*J. S. Bailey.*

365. ANONYMOUS. Vegetable marrows at Wisley, 1923. Jour. Roy. Hort. Soc. 49: 118-120. 1924.—This is a list of awards and descriptive notes of a variety test of 54 stocks of vegetable marrows.—*J. S. Bailey.*

366. ANONYMOUS. Winter-flowering carnations at Wisley, 1921-1923. Jour. Roy. Hort. Soc. 49: 78-96. 1924.—This is a discussion of the handling and flowering of the plants in a variety test of a large number of perpetual flowering types of carnations. Also a list of awards with descriptive notes is given.—*J. S. Bailey.*

367. ABBOT, J. LLOYD. The satsuma industry on the Gulf coast. Citrus Indust. 4¹: 14-15, 34. Illus. 1923.—A brief account is given of the introduction and establishment in this country of the satsuma orange, and of its subsequent history.—*Arthur S. Rhoads.*

368. ABBOTT, GAIL T. Will nitrogen pay on plums? Amer. Fruit Grower 43¹: 12. Illus. 1923.—A case in Ohio is cited in which the use of $(\text{NH}_4)_2\text{SO}_4$ in a plum orchard greatly stimulated fruit production.—*Arthur S. Rhoads.*

369. ALLEN, W. J., AND W. W. COOKE. Prunes and plums on various stocks. Agric. Gaz. New South Wales 35: 453. 1924.—Notes are given relative to growth, crop, height of tree, and spread and diameter of trunk of 5 varieties of prunes and plums, each grown on 4 different stocks.—*L. R. Waldron.*

370. BARNEY, JOHN W. Grafting old citrus trees. Citrus Indust. 4⁵: 14-15. 1923.—The author describes the proximal slot graft, a modification of a method of grafting nut trees described by Robert Morris. This modification was designed to supply Florida's needs in working over and propagating citrus, avocado, mango, and other subtropical trees.—*Arthur S. Rhoads.*

371. BASKIN, J. L. Development of early apple in Tennessee. Amer. Fruit Grower 44⁸: 8, 10. Illus. 1924.—This is a sketch of the early apple in Tennessee.—*Arthur S. Rhoads.*

372. BATCHELOR, L. D. The present status of the walnut in California. Amer. Fruit Grower 43⁵: 7, 34. Illus. 1923.—The walnut industry in California is described with special reference to history of walnut culture in California, age of profitable bearing and length of life of walnut trees.—*Arthur S. Rhoads.*

373. BOLLES, W. E. Banana growing in Florida. Citrus Indust. 4⁶: 16-18, 34. 1923.

374. BOWLES, E. A. Autumn crocuses. Jour. Roy. Hort. Soc. 48: 161-167. Fig. 28-35. 1923.—The crocuses blooming from mid-September until April are discussed, and suggestions as to their care are given.—*J. K. Shaw.*

375. BROOKS, O. Nursery methods that affect profits. Agric. Gaz. New South Wales 35: 515-520. 1 fig. 1924.—This article deals primarily with citrus stock.—*L. R. Waldron.*

376. BROWN, GORDON G., AND LEROY CHILDS. Pruning and fertilizing the D'Anjou pear. Amer. Fruit Grower 43¹¹: 3, 12-13. Illus. 1923.—The tardiness and irregularity of the D'Anjou pear in coming into bearing are discussed. It is suggested that this irregular condition may be due to self-sterility or to intersterility with the common varieties with which

it is grown; also that it may be a functional trouble depending on the character and proportion of stored food within the tree. The results of several years of observation and experiments in pruning and fertilization of this pear are set forth. The observations of the writers indicate clearly that the D'Anjou pear needs plenty of room in the orchard and that sunlight is absolutely essential to regular bearing.—*Arthur S. Rhoads*.

377. CARHART, A. H. Christmas landscapes. *Amer. Forest* 29: 723-726. 8 fig. 1923.

378. CHITTENDEN, F. J. New or noteworthy plants in the Society's gardens IV. *Jour. Roy. Hort. Soc.* 48: 234-235. 1923.—Brief discussions are given of *Putoria calabrica*, *Hypericum forrestii* and *Rosa sweginzowii*.—*J. K. Shaw*.

379. CHITTENDEN, F. J. New or noteworthy plants in the Society's gardens, V. *Jour. Roy. Hort. Soc.* 49: 47-49. Fig. 11-14. 1924.—This is a discussion, including descriptions, of the introduction, culture and value of *Sedum pruinaum*, *Berberis replicata*, *Rhododendron lutescens*, *Spenceria ramalana* and *Primula fasciculata*.—*J. S. Bailey*.

380. CHITTENDEN, F. J. The award of garden merit, III. *Jour. Roy. Hort. Soc.* 48: 223-231. 1923.—Brief discussions are given of the following plants that have been given the Award of Garden Merit of the Royal Horticultural Society. *Viburnum fragrans*; *Jasminum nudiflorum*; *Hyacinthus azureus*; *Tulipa kaufmaniana*; *Forsythia intermedia spectabilis*; *Osmanthus delavayi*; *Viburnum carlesii*; *Corylopsis pauciflora*; *Pyrus floribunda*; *Pyrus purpurea*; *Berberis stenophylla*; *Magnolia stellata*; *Philadelphus grandiflorus*; *Genista virgata*; *Spartium junceum*; and *Genista aethnensis*.—*J. K. Shaw*.

381. CHRISTY, MILLER. The garden Polyanthus: its origin and history. *Jour. Roy. Hort. Soc.* 49: 10-24. 1924.—It is shown by the author that the garden polyanthus is not "one of the oldest of the florists' flowers" but originated about the middle of the 17th century, the exact date not being clear. Its parent is undoubtedly the hybrid oxlip, probably the wild red hybrid oxlip, although it is shown that it may have developed from the hybridization of the cultivated form in the garden. The hybrid oxlip itself is a cross of primrose \times cowslip (*P. veris* \times *P. vulgaris*).—*J. S. Bailey*.

382. COHEN STUART, C. P. Produktie-vermeerdering door selectie. [Production increase by selection.] *Thee* 4: 8-11. 1923.—A brief report is given of yields of selections in tea. Two races tested on a large scale gave, respectively, 1.4 and 1.8 times as much yield as the general average.—*Carl Hartley*.

383. COHEN STUART, C. P., AND R. MENZEL. Het slechte theezaad. [The poor tea seed.] *Thee* 4: 7-8. 1923.—Reports indicate poor germination for the current crop in addition to what can be accounted for by insect damage and the use of over-old seed trees.—*Carl Hartley*.

384. CONNOR, EDWARD. Cherry culture in France. *Amer. Fruit Grower* 44⁵: 12. 1924.

385. CRUESS, W. V., AND A. W. CHRISTIE. Home canning. *California Agric. Exp. Sta. Circ.* 276. 1-37. 1924.—This is based on Circular 158, "Home and farm canning," rearranged and rewritten. It deals with: (1) Principles of canning, (2) methods, materials and equipment, (3) special directions for fruits, (4) special directions for vegetables, (5) special directions for meats, (6) ptomaine and botulinus poisoning, and (7) condensed directions.—*A. R. C. Haas*.

386. CUTTING, A. B. Sense and sex in strawberry names. *Amer. Fruit Grower* 43³: 10, 45. 1923.—The writer points out the present confusion of sex in names of strawberry varieties, showing that at present many female varieties have male names. It is suggested that all new varieties be given names that indicate the sex of the flowers.—*Arthur S. Rhoads*.

387. DARROW, W. H. Fertilizing the sod orchard. *Amer. Fruit Grower* 43¹: 12. 1923.—An experiment in Connecticut is cited in which the application of NaNO_3 just before the blooming period and the cutting of the grass as a mulch in 1 block of an apple orchard increased the returns over 400% as compared to a similar block in which no fertilizer was applied and the grass was removed as hay.—*Arthur S. Rhoads*.

388. DATE GROWERS INSTITUTE. Report of the First Date Growers Institute at Coachella in Coachella Valley, California, February 29th and March 1st, 1924. 36 p. Coachella Valley Farm Center: Coachella, California. 1924.—"The transposition of date palms from the Old World to the New and the successful establishment on a new and modern basis here in

our own Southwest of an industry as old as civilization itself, marks what is perhaps the most wonderful of all great achievements in the realm of Horticulture. . . . In the publication of the experiences and personal opinions of pioneer growers and others closely identified with date culture, as set forth in these [25] papers given at the 'First Date Institute Held in America' it is hoped that a beginning has been made toward the recording of date history that may be said to be truly American."—(*From Foreword by T. J. Gridley.*)

389. DAVIS, P. O. Florida blueberry attracts attention. Amer. Fruit Grower 43¹¹: 7, 17. *Illus.* 1923.—This is a description of the commercial growing of blueberries at Crestview, Florida, the plants used being native, tree-blueberries obtained from nearby swamps.—*Arthur S. Rhoads.*

390. DEMING, W. C. The story of our Christmas nuts. Amer. Forests and Forest Life 30: 7-10, 55. 9 *fig.* 1924.—This is a popular article.—*C. H. Otis.*

391. FOX, ALVIN. Avocado culture in Florida. Citrus Indust. 4¹²: 9. 1923.—Cultural practices are briefly discussed.—*Arthur S. Rhoads.*

392. FOX, ALVIN. Methods of fertilizing orange trees. Amer. Fruit Grower 43¹: 5, 27. 1923.—Consideration is given to forms in which fertilizers are applied, importance of N source, secondary effects of fertilizers, relation to quality of fruit, time and method of application, proportions, quantity, and variation of the ingredients.—*Arthur S. Rhoads.*

393. GAGE, EARLE W. A fruit grower's paradise. Amer. Fruit Grower 44¹: 10, 15. *Illus.* 1924.—This is a description of fruit growing in the Hawaiian Islands with special reference to pineapple and litchi nuts.—*Arthur S. Rhoads.*

394. GROSSENBACHER, J. G. Spring fertilization. Citrus Indust. 4²: 18. 1923.—The author considers February the best time to make the spring application of fertilizer to bearing citrus groves in Florida, but considers that for young trees late February and March is more timely.—*Arthur S. Rhoads.*

395. GRUSDORF, A. Mammoth-Excelsior-Sommer-Levkoje. [Mammoth Excelsior Summer Stock.] Möllers Deutscher Gärtnerzeitg. 39: 191-192. 1 *fig.* 1924.—This race of *Matthiola annua* develops tall plants, and flowers of 6 cm. and more in diameter. About 75% of the seedlings are double-flowering, consequently seed production is small. Varieties with various colors of flowers are known.—*J. C. Th. Uphof.*

396. HARGREAVES, SHEBA. A natural brace for fruit trees. Amer. Fruit Grower 44⁴: 47. *Illus.* 1924.—This is a description of a method of developing natural braces for fruit trees by twisting or braiding together pliant shoots from adjacent branches.—*Arthur S. Rhoads.*

397. HARNDEN, ROBERT. Citrus fruit culture in Spain. Citrus Indust. 4²: 9, 28. 1923.

398. HEDRICK, U. P. Notes of a horticulturist in Europe. Amer. Fruit Grower 43³: 9. 1923.—This is an account of horticultural observations made on a tour through Europe.—*Arthur S. Rhoads.*

399. HEIDE, F. F. R. Biologische enderzoekingen bij Landbouwgewassen. III. Bewaring en verzending van zaden en vegetatieve vermeerderingserganen van tropische gewassen. [Biological studies of agricultural plants. III. Storage and transportation of seeds and vegetative propagating material of tropical plants.] With English summary. Mededeel. Alg. Proefsta. Landb. Dept. Landb. Nijv. en Handel (Dutch East Indies) 14: 38-46. 1923.—A list is given of plants whose seeds withstand drying and can be shipped for long distances simply packed in a mixture of powdered dry charcoal and powdered coconut fibre. Another list includes plants which will stand little drying. These are successfully handled by drying for 2 days under shade, soaking for 1 hour in a 1% solution of salicylic acid and then packing in the charcoal-coconut-fibre mixture, which has been moistened with the same solution. Fruit of *Citrus mitis* was successfully preserved and the seed kept viable for 4 weeks, by wrapping in oiled paper and packing in tins with kapek fibre. Cuttings of cassava and *Plumiera acuminata*, after drying 2 days in the sun, are closed at the ends with paraffine and wrapped in oiled paper, rooting well after 5 and 7 weeks respectively. Rhizomes and tubers in the same packing material kept well, small tubers doing as well as large ones.—*Carl Hartley.*

400. HEPNER, M. J. Some interesting rootstock figures. *Amer. Fruit Grower* 44³: 37. 1924.—A comparison is made of the relative quantities of the various rootstocks used in propagating deciduous fruit trees in California in 1922 as compared with those in 1919 and the changing preferences brought out in the comparison of these figures are discussed.—*Arthur S. Rhoads*.

401. HEPNER, M. J. Sundrying California fruits. *Amer. Fruit Grower* 44³: 7, 11. *Illus.* 1924.—The sun-drying of California fruits in general is discussed with regard to the dry-yard, sulphuring, and sweating the fruit. The sun-drying of apricots, peaches and pears is specifically discussed.—*Arthur S. Rhoads*.

402. HOFFMAN, JOHN C. Origin of the York Imperial. *Amer. Fruit Grower* 44¹: 27. *Illus.* 1924.—A brief account is given of the origin of the York Imperial apple.—*Arthur S. Rhoads*.

403. HOWARD, W. L. An old world nursery. *Amer. Fruit Grower* 43¹¹: 8, 21. *Illus.* 1923.—This is a descriptive account of the Fratelli Sgaravatti Nurseries of Saonara (Padova), Italy.—*Arthur S. Rhoads*.

404. JEFFERIES, J. H. New method of giving a tree a new root system. Reprint Florida Agric. Exp. Sta. Press Bull. 359. *Citrus Indust.* 5⁶: 30. 1924.—The writer describes a method of developing a secondary root system on citrus trees by cutting out a $\frac{1}{4}$ inch strip of bark $\frac{1}{2}$ way around the trunk just above the bud union and banking the soil well up above this partial ringing and leaving it until the new root system is formed and well established. This system of partial ringing is especially applicable to sweet seedling orange trees that are attacked by foot-rot. In healthy trees the effect of the rootstock can be modified by the development of the secondary root system from the trunk above the bud union. This method is considered less expensive than inarching when it is desired to change the rootstock.—*Arthur S. Rhoads*.

405. JEFFRIES, JOHN H. Report of superintendent Citrus Exp. Sta. (Lake Alfred.) Florida Agric. Exp. Sta. Ann. Rept., 1922: 62R-67R. 1922.—A description is given of a quarantine cage designed to make safe the introduction of new citrus plants; in it importations of citrus species and varieties and related genera are tested for 2 years; if no disease develops, they are set out in grove form. The object of progeny grove work is to produce a grove with buds from record trees that are heavy producers of typical fruit of commercial varieties. The dieback experiments are intended to ascertain whether any of the different forms of fertilizer cause dieback.—*J. C. Th. Uphof*.

406. KAY, A. O. Irrigation of citrus groves in Florida. *Citrus Indust.* 4⁷: 5-8. *Illus.* 1923.—Observations on 1-year-old orange trees and 9-year-old grapefruit trees under various soil and drainage conditions, made after a drought on the East Coast, are presented in an endeavor to determine the effect of deficiency of soil moisture on citrus trees. These observations indicate that when the moisture content in the surface soil becomes lower than 5% a tree will begin to wilt and its growth will be retarded. For continuous growth a higher percentage of moisture should be present in the 1st 2 feet. The injurious action on the roots of a considerable fluctuation in the H₂O table is considered. Complications caused by irregularities in the available soil moisture exist where there is insufficient drainage or where there is an impervious substratum. An estimate is given of the amount of irrigation believed to be required for Florida citrus soils.—*Arthur S. Rhoads*.

407. KEUCHENIUS, A. Iets over het markotteeren van thee. [Notes on marcotting tea.] *Thee* 4: 5-7. 1 pl. 1923.—Marcotting (pot layerage) is advantageous where it is desired to propagate a plant vegetatively on its own roots. Bamboo gave the best results as a sheathing material in developing the marcot. Inch-thick 2-3-year-old water sprouts proved the best material. The marcots should be made at the time of most vigorous growth, and transplanted about 10 months later. It was found best to cut back about $\frac{1}{2}$ of the roots in transplanting. In making the marcots, the branch is girdled for a distance of 3-4 cm. and the wood cambium usually scraped away over the middle of the stripped belt. Above this ring, wounds are made at the former leaf and twig bases, 1 cm. or more in diameter according to the diameter or the stem. A bamboo sheath 7-10 cm. inside diameter is split, the halves are then bound on, and sand filled with loose forest humus, is lightly tamped around.—*Carl Hartley*.

408. KEUCHENIUS, A. A. M. N. De vegetatieve voortplanting van thee. [The vegetative propagation of tea.] Mededeel. Proefsta. Thee. Dept. Landb. Nijv. en Handel, (Dutch East Indies) 84: 1-48. 28 fig. 1923; 85: 1-16. 28 fig. 1923. [Summary of Mededeel. 84: 1-48.]—By attention to the 9 different factors listed, 74% average success was obtained in crown grafting; this success together with its cheapness establishes this method as economically the best. Patch budding gave 87% success, but proved too expensive. In general, vegetative propagation is most useful in establishing seed plantations, but it also has potentialities in the improvement of poor individual plants in already established plantings, and it makes possible the securing of a more uniform product. Upright stem (pot) layerage or marcotting (see also preceding entry) in bamboo cylinders has been developed and is much more successful than marcots protected in the usual native way. Fifty-two per cent survival was secured with marcots; their field of usefulness lies in cases in which it is desired to have the plant on its own roots without any chance of influence of a foreign stock on the scion. Inarching gave 98% success, but is too laborious a process. Veneer grafting, as used in quinine, gave only an average survival of 20%, with a maximum of 37%. Shield grafting could not be made to give better results than veneer grafting. Cleft grafting, the standard method with coffee, gave only 4% survival. Shield budding gave a survival of only 2%, though the resulting plants showed remarkable vigor. Budding by veneering, though like the successful patch budding, proved a complete failure, as did also splice grafting, and a few trials of crown grafting by triangular inlaying. Horizontal layerage did not give as good results as did cutting back the entire plant with the exception of 3-5 vigorous shoots which were then ringed and covered with soil at the base; this latter method gave 94% success. Only 2% of the cuttings rooted. Crown grafting, budding, and pot layerage are described in some detail.—*Carl Hartley.*

409. LEWIS, C. I. Why some fruit trees do not bear. Amer. Fruit Grower 43⁴: 3, 19, 21. *Illus.* 1923.—The reasons for the lack of productivity in some fruit trees are analyzed in detail and trees of this character divided into 2 classes. In the 1st class are placed those trees which do not form fruit buds; in the 2nd are placed those that bloom freely and yet fail to produce a crop. Environmental and internal factors associated with these conditions are discussed and corrective treatments indicated.—*Arthur S. Rhoads.*

410. LODIAN, L. Some curious comestibles. Sci. Amer. 129: 224-225. 8 fig. 1923.—This briefly describes compressed rice-macaroni blocks, disguised walnut kernels or nut-and-fruit-juice cakes, palm sugar with rose fragrance, the nut-peach, stone-hard syrupless sugar-dates, tropical American cane sugar (muscabedo), together with certain animal products, all of them food materials from Asia and the Orient which may be unearthed in odd corners of American cities.—*Chas. H. Otis.*

411. LORD, E. L. Grape varieties. Grape Indust. 5¹: 11, 42. 1924.—Although it is considered perfectly possible for grape growers in Florida to produce and sell good grapes locally and in northern markets at an attractive profit, the writer does not consider that the ideal variety of grape for Florida conditions has yet been found. The characteristics of this ideal variety are set forth.—*Arthur S. Rhoads.*

412. McDILL, REX. Guavas. Citrus Indust. 4¹⁰: 11, 33. 1923.—A popular account is given of the guava (*Psidium guajava* Raddi), which grows wild through the entire American tropics, and of the commercial manufacture of guava jelly, guava paste, creme de guajava, and cascara de guajava.—*Arthur S. Rhoads.*

413. McLEAN, H. C. The citrus industry in Italy. Citrus Indust. 4⁶: 12-14. 1923.

414. MACHERAUCH, OSWALD. Macherauch Samling. [Macherauch's seedling.] Möllers Deutscher Gartnerzeitg. 39: 189. 1 fig. 1924.—This is a large-fruited yellow gooseberry suitable for market and home use.—*J. C. Th. Uphof.*

415. MARSHALL, ROY E. Air-cooled storages for apples. Amer. Fruit Grower 44⁷: 3, 10. *Illus.* 1924.—This is a description and discussion of air-cooled storage houses for apples as designed and used in Michigan.—*Arthur S. Rhoads.*

416. MATLACK, SHELTON S. Meet the avocado. Florida Grower. 30⁸: 4-5. 1924.—A description of the picking, grading, packing and shipment of the avocado is given.—*J. C. Th. Uphof.*

417. MATTHEWS, C. D. Report of the Division of Horticulture. Ann. Rept. North Carolina Agric. Exp. Sta. 46: 81-89. 1923.—A general statement is given concerning the projects dealing with apples, peaches, pecans, strawberries, potatoes and cabbage. The results are like those in previous reports.—*F. A. Wolf*.

418. MAXWELL, HERBERT. Some hardy bulbs. Jour. Roy. Hort. Soc. 48: 213-222. 1923.

419. MOSNAT, H. R. The Lewis black walnut. Amer. Fruit Grower 43⁶: 29, 30. 1923.—A description is given of the Lewis hardy black walnut which is said to have great commercial possibilities by virtue of the readiness with which the meats can be extracted.—*Arthur S. Rhoads*.

420. MOWRY, HAROLD. Hedges for Florida. Florida Agric. Exp. Sta. Bull. 172. 1-19 Fig. 1-18. 1924.—Cultural details are given and suitable species designated.—*J. C. Th. Uphof*.

421. MOWRY, HAROLD Report of assistant horticulturist. Florida Agric. Exp. Sta. Ann. Rept. 1923: 114R-118R. 1923.—A short outline of the future work on citrus, grapes and pecans is presented. Two ornamental trees, *Koelreuteria formosana* and *Poupartia axillaris*, are worthy of notice.—*J. C. Th. Uphof*.

422. MUSGRAVE, C. T. Methods of propagation in an amateur's garden. Jour. Roy. Hort. Soc. 48: 188-200. 1923.

423. O'BYRNE, F. M. More about Cleopatra as a root stock. Citrus Indust. 5⁷: 9, 28. 1924.—The writer believes that the Cleopatra stock merits investigation but does not consider extensive plantings of it advisable at present.—*Arthur S. Rhoads*.

424. NILES, L. D. Root stocks in relation to better fruit. Citrus Indust. 4⁹: 6-7, 46. 1923.—Rootstock selection should be made with due reference to local environmental conditions. The merits of sweet orange, sour orange, bittersweet orange, rough lemon, and Cleopatra mandarin as rootstocks for citrus trees are discussed.—*Arthur S. Rhoads*.

425. REASONER, E. N. Rare citrus varieties. Citrus Indust. 4⁹: 20. 1923.—The gradual disappearance of many rare varieties of orange, lemon, lime, shaddock, and citron, that grew in Florida groves and gardens 30 or 40 years ago receives comment. The freeze of 1894-1895 is regarded as responsible for the loss of many of these fruits. The desirability of assembling and study of these under present conditions is presented.—*Arthur S. Rhoads*.

426. RUPRECHT, R. W. Report of chemist. Florida Agric. Exp. Sta. Ann. Rept. 1923: 46R-51R. 1923.—(1) Dieback of citrus: A light case developed on the check plot, apparently due to overfertilization, as the entire grove showed indications of over-feeding. Since the amount of NH_3 was reduced materially in the fall application of fertilizer all signs of dieback have disappeared. An analysis of soil around the affected trees, compared with an analysis of soil around normal trees, showed no differences which would indicate the cause of disease. The effect of CuSO_4 on nitrification and ammonification in soils was negative. Tank studies were begun in order to determine more accurately whether over-fertilization with any of the fertilizer constituents will induce dieback. (2) Nutrition studies: Fertilizing oranges produced marked differences varying with the several forms of phosphoric acid used.—(3) Pecan investigations.—(4) Tobacco experiments.—*J. C. Th. Uphof*.

427. SCHMID, PAUL. *Cineraria multiflora nana*. Möllers Deutscher Gärtnerzeitg. 39: 132-133. 1 fig. 1924.—*Cineraria multiflora nana* is an excellent pot and market plant attaining a height of about 25 cm. and a flower diameter of 3 cm.—*J. C. Th. Uphof*.

428. SERRE, P. La culture du Cacaoyer au Costa Rica. [Culture of the cacao in Costa Rica.] Bull. Mus. Hist. Nat. [Paris] 27: 260-264. 1921.—This paper gives a brief account of the optimum conditions attending successful culture of the cacao in Costa Rica, assembling the information under the following headings: (1) Choice of ground—alluvial valleys are found to be the most favorable situations, (2) Seed—a carefully selected hybrid gives best results; (3) Care—the 1st 18 months is the most critical period in the life of the plants; (4) Shade—trees are planted to insure humid and shady location for cacao plants; (5) Diseases—insects are found to be the most dangerous enemies of these plants.—*John M. Fogg, Jr.*

429. SKINNER, L. B. Some observations on citrus root stocks. Citrus Indust. 5⁶: 5-7, 34. 1924.—The influence of the citrus rootstocks commonly used in Florida on yield, quality of fruit and life of tree are discussed. The writer regards the Cleopatra mandarin as the best rootstock for citrus trees in Florida.—*Arthur S. Rhoads*.

430. SPOFFORD, CHARLES B. Citrus fruit production in India. *Citrus Indust.* 4¹¹: 8-10. 1923.

431. SWINGLE, WALTER T. Low temperature dehydration of cane sugar dates. Rept. 1st Date Growers' Institute. *P.* 31-32. Coachella Valley Farm Center: Coachella, California, 1924.—This is an address before the Date Growers' Institute. ". . . it is obvious . . . that it would be easily possible to arrange a dehydration plant that would dry freshly-processed Deglet Noor dates rapidly and easily by insuring a proper circulation of dry air."—*Frederick V. Rand.*

432. TANAKA, TYOZABURO. The citrus industry in Japan. *Citrus Indust.* 4⁷: 9-10. 1923.—Extracts are given from *Internation. Rev. Sci. and Practice Agric.*, N. S. 1: 32-35. 1923.—*Arthur S. Rhoads.*

433. TROWBRIDGE, P. F. Experiment station progress. Report of director, July 1921, to June 30, 1923. *North Dakota Agric. Exp. Sta. Bull.* 174. 49-54. 3 fig. 1924.—Brief notes are given on varieties of vegetables, fruit, and ornamentals. Notes are given also on satisfactory greenhouse crops for North Dakota.—*L. R. Waldron.*

434. TUFTS, WARREN P. A new departure in pear growing. *Amer. Fruit Grower* 43¹¹: 7, 34. *Illus.* 1923.—This is a description of the Caldwell system of pear pruning, a method that is now on trial in different parts of California. Briefly stated, this system consists in tying down the upright 1-year-old shoots to an angle somewhat below the horizontal in order to induce fruitfulness. The resultant new growth arises just below the highest point of the bend and practically all new growth beyond this point is reproductive in character and rapidly produces a good fruit-spur system. The advantages and disadvantages of this system are discussed.—*Arthur S. Rhoads.*

435. ULTEE, A. J. Groenbemesters in Rubber en Koffietuinen. [Green manuring on rubber and coffee plantations.] *Mededeel. Proefsta. Malang* 45. 1-6. 1924.—From the results obtained on the various estates where the legumes, *Tephrosia Vogelii*, *Centrosema plumieri* and *Mimosa*, *Vigna* were grown between the principal crops, the writer advises the use of legumes as green manures.—*Cecil Yampolsky.*

436. VINSON, A. E. The chemistry of the date. Rept. 1st Date Growers' Inst. *P.* 11-12. Coachella Valley Farm Center: Coachella, California, 1924.—This is an address before the Date Growers' Institute.—Two chemical varieties of dates exist: the invert and the cane sugar types. Most of the tannin of the date is deposited as insoluble grains in a zone of tannin cells near the cuticle. Premature ripening may be induced commercially by CO₂ or by killing the protoplasm with heat. The keeping quality may be improved, insects and their eggs destroyed, and the palatability improved by pasteurization.—*Frederick V. Rand.*

437. WARTMANN, H. A. The relation of root stock to better fruit production. *Citrus Indust.* 4¹⁰: 10, 46. 1923.—The writer discusses the comparative merits of sour orange, rough lemon, bittersweet orange, Cleopatra mandarin, *Citrus trifoliata*, and the citrangequat as rootstocks for citrus trees, as regards both the growth of the tree and the quality of the fruit. He considers the sour orange in general the best rootstock known. It is concluded that rootstocks have much to do with the quality of fruit produced.—*Arthur S. Rhoads.*

438. WEBBER, H. J. Program for improvement of the date industry. Rept. 1st Date Growers' Inst. *P.* 5-6. Coachella Valley Farm Center: Coachella, California, 1924. This is an address before the first Date Growers' Institute. The author believes that these institutes will soon establish a literature of date growing that will be unequalled in any industry.—*Frederick V. Rand.*

439. WILLIAMS, R. O. The tropical flower garden. *Jour. Roy. Hort. Soc.* 49: 1-9. 1924.—In the tropical climate of India, flowers cannot be handled as they are in temperate climates. Some general directions are given for planning and handling a flower garden in the tropics. The Royal Botanic Garden at Trinidad is described as a good model. More specific directions are given for handling some of the species which are used successfully in tropical flower gardens.—*J. S. Bailey.*

440. WOODALL, E. H. A garden on the Riviera. *Jour. Roy. Hort. Soc.* 49: 37-39. 1924.

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 58, 131, 150, 231, 245, 246, 579, 661, 662, 874, 959)

441. AGHARKAR, S. P. On the abnormalities of the flowers of *Musa superba* and *Musa paradisiaca*, subsp. *sapientum*. Jour. Indian Bot. Soc. 4: 18-20. 1 pl. 1924.—In the examination of 2618 flowers of the Rajela variety of *M. paradisiaca*, 4 types of perianth were found, ranging from a condition of 3 sepals and 3 petals, all separate, to the usual one where the sepals and petals are united into a strap-shaped structure leaving 1 petal free. Free perianth lobes are regarded as primitive. The usual number of stamens is 5, but 4, 3, and rarely 6 were found. *M. superba* ordinarily has 6 stamens, but 7, 8, and 9 were occasionally met with. While a larger number of stamens usually is regarded as primitive, in *Musa* it is the reduced number that is associated with the most primitive type of perianth, and the larger number appears to have arisen by chorisis. In a few flowers 1 style was separate, and occasionally it passed between the anther lobes of 1 of the stamens, as in Zingiberaceae. This suggests that, in *Musa*, separation of the carpels is a derived, and not a primitive condition. The observations are too incomplete to warrant the drawing of conclusions.—Winfield Dudgeon.

442. BRIQUET, J. Le Mélanérythrisme floral chez le *Daucus carota* L. [The dark-red flower in *Daucus carota* L.] Ann. Conservatoire et Jard. Bot. Genève 21: 473-480. 1922.—This is a discussion of the morphology and development of the dark flowers seen at the center of the umbel in the carrot.—A. S. Hitchcock.

443. BUGNON, P. Dichotomie foliaire chez le Gui (*Viscum album* L.) [Foliar dichotomy of *Viscum album*.] Compt. Rend. Acad. Sci. Paris 178: 1305-1307. Fig. 1-11. 1924.—A series of intermediate stages between the simple and the double or dichotomous leaf is presented and is employed as evidence in support of the theory of the meriphytic origin of leaves.—C. H. Farr.

444. CALVINO, E. M. Casos raros de cleistanteria observados en Cuba. [Rare cases of cleistandry observed in Cuba.] Mem. Soc. Cubana Hist. Nat. "Felipe Poey" 5: 99-105. 1923.—Cases in which the anthers remained closed, the pollen grains germinating in the unbroken anther sacs, were observed in *Basella rubra*, *Lucuma serpentaria*, *Tournefortia gnaphalodes*, *Micranthemum orbiculatum*, *Coffea arabica*, *Gardenia Thunbergia*, and *Melanthera deltoides*. Cleistandry was induced in *Commelinia nudiflora* by keeping the young flowers of this species in the dark. It is concluded that this phenomena is brought about by special nutritive conditions.—J. A. Faris.

445. CEJP, C. Einige Bemerkungen über die Diagrammatic der Rosaceen. [Floral arrangement in the Rosaceae.] Oesterreich. Bot. Zeitschr. 73: 48-58. 1924.—In the Rosaceae a change is to be noted in the number of floral parts, primarily in the number and arrangement of stamens and carpels. Typical acyclic flowers no longer exist and there are only occasional hemicyclic flowers in which the carpels are arranged spirally. More frequent is the occurrence of supernumerary whorls with an approach to the eucyclic form. The occurrence of spiral arrangement in the androecium is a secondary phenomenon caused by a gradual increase in the supernumerary whorls of the stamens. Chorisis and other changes have often been responsible for the changing of a eucyclic into a heteromeric flower. Upon further changes these flowers became oligo- or pleiomeric. Groups within the Rosaceae which still show acyclic tendencies also exhibit the greatest degree of variation. Compared to the Ranunculaceae, however, the Rosaceae have a greater constancy in their flower development.—Ernst Artschwager.

446. COSTANTIN, J. Note de morphologie externe: Le port des Figuiers-Banyans. [External morphology of the banyan-figs.] Bull. Mus. Hist. Nat. [Paris] 27: 187-190. 1921.—The names and habitats of over 20 species of *Ficus*, in which the aerial root systems simulate that of *F. religiosa*, are tabulated.—John M. Fogg, Jr.

447. DEBBARMAN, P. M. An instance of staminody and multiplication of petals, etc., in *Cadaba trifoliata* W. & A. Jour. Indian Bot. Soc. 3: 275-276. 2 fig. 1923.—An abnormal flower collected in south India is described.—Winfield Dudgeon.

448. HOCHREUTNER, B. P. G. Organes carpiques nouveaux ou méconnus chez les Malvacées. [New or unrecognized carpellary organs in the Malvaceae.] Ann. Conservatoire et Jard. Bot. Genève 21: 347-387. 1920.—This is a discussion of the morphology of the fruit of several genera.—A. S. Hitchcock.

449. LONG, FRANCES. Latex and laticiferous tissue. Carnegie Inst. Washington Year Book 22: 311. 1924.—This is a progress report.—B. E. Livingston.

450. MCCREA, R. H. Abnormal flower of the honeysuckle (*Lonicera periclymenum* L.). New Phytol. 23: 159-160. 5 fig. 1924.—A double flowered specimen found near Whitby is recorded.—I. F. Lewis.

451. PARTHASARATHY IYENGAR, M. O. Note on a bulbiferous cocoanut tree from Malabar. Jour. Indian Bot. Soc. 3: 289-291. 1 pl. 1923.—A cocoanut tree on the Malabar coast (India) bears, in the place of each inflorescence, a leafy bud which eventually becomes detached. These buds show a gradual transition from scaly leaves on the outside to more or less fully developed pinnate leaves at the center.—Winfield Dudgeon.

452. PETERSEN, HENNING E. Studier over Polymorphien hos *Vaccinium uliginosum* L. [Studies on polymorphism in *Vaccinium uliginosum* L.] Bot. Tidsskr. 38: 217-239. 1924.—According to the author, polymorphism is an index of the development of an organism, and all organisms are polymorphic. The author studied variation in the leaves of this species, using flower and vegetative shoots which were not over 12 cm. long, care being taken not to include water sprouts. The statistical method as here used involved the shape and size of the leaf itself, and measurements to show whether the greatest diameter passed through the middle of the leaf or away from it, and whether the diameter was 55 or 75% of the length. In all, 1070 individuals collected from 18 different localities were examined. A brief French review is appended.—A. L. Bakke.

453. REMMER, A. W. A study of the wheat berry. Nation. Miller 29⁶: 18. 1924.—Notes on the physiology of germination and a simple description of the morphology of the wheat plant are given.—Carleton R. Ball.

454. RYTZ, W. Amerikanische und africanische Schwimmhölzer. [American and African corkwoods.] Mitteil. Naturf. Ges. Bern 1923: XIII. 1924.—In various corkwoods from Central America and Africa, of which *Aeschynomene Elaphroxylon* may be especially mentioned, the author finds, in the libriform tissue, a development of cells in which the wall is very thin, the lumen very wide, and the volume of air great. In this way the buoyancy of the wood is increased.—S. Blumer.

455. SAUNDERS, EDITH R. The bractless inflorescence of the Cruciferae. New Phytol. 22: 150-156. Pl. 3. 9 fig. 1923.—After a description of the occasional occurrence of bracts subtending the lower flowers of *Matthiola incana* and *Cheiranthus Cheiri*, it is concluded that "the description of the cruciferous inflorescence as 'bractless' must be understood to mean that it is only the free, exerted region of the bract which has undergone suppression, the basal extension being still formed and clothing the axis with a 'leaf-skin' in the same manner as if the region above the exertion level had attained full development." After the reduction of the bracts to their basal extensions, a favorable conjunction of circumstances may allow the reappearance of the exerted portion.—I. F. Lewis.

456. SNOW, R. An apocarpic plant of the red campion (*Lychnis dioica* L.). New Phytol. 22: 156-158. 4 fig. 1923.—The presence of 5-8 free carpels with freely exposed ovules on their adaxial surface is noted.—I. F. Lewis.

457. SOUÈGES, RENÉ. Embryogénie des Graminées. Développement de l'embryon chez le *Poa annua* L. [Embryogeny of the Gramineae. Development of the embryo in *Poa annua*.] Compt. Rend. Acad. Sci. Paris 178: 860-862. Fig. 1-19. 1924.—This paper traces the origin of the coleoptile and rhizoptile, the meristems of shoot and root, the epiblast and hypoblast, and the scutellum. The coleoptile is formed by the scutellum growing over the meristem of the shoot and fusing there in much the same manner as the integuments cover the nucellus in the ovule. The author compares the development of this embryo with that of the Liliaceae, which it resembles to some extent.—C. H. Farr.

458. SOUÈGES, RENÉ. Embryogénie des Linacées. Développement de l'embryon chez le *Linum catharticum* L. [Embryogeny of the Linaceae. Development of the embryo in *Linum*

catharticum.] Compt. Rend. Acad. Sci. Paris 178: 1307-1310. Fig. 1-30. 1924.—The development here described and depicted is somewhat similar to that in the Solanaceae.—C. H. Farr.

459. SOUÈGES, RENÉ. Embryogénie des Polygonacées. Le développement de l'embryon chez le *Polygonum aviculare* L. [Embryogeny of the Polygonaceae. Development of the embryo in *Polygonum aviculare*.] Compt. Rend. Acad. Sci. Paris 178: 409-412. Fig. 1-19. 1924.—The development of this embryo is of the type already defined for the Polygonaceae, but in the outcome of some of its stages it also represents an interesting intermediate form between this type and that of *Urtica pilulifera* or of the Compositae.—C. H. Farr.

460. SOUÈGES, RENÉ. Embryogénie des Rubiacées. Développement de l'embryon chez le *Sherardia arvensis* L. [Embryogeny of the Rubiaceae. Development of the embryo in *Sherardia arvensis*.] Compt. Rend. Acad. Sci. Paris 178: 1919-1921. Fig. 1-29. 1924.—Embryonic development in this species is similar to that in the Solanaceae. Although this type of embryogeny seems quite aberrant, it is significant that it occurs in 3 distinct families: Solanaceae, Linaceae, and Rubiaceae.—C. H. Farr.

461. TIRUNARAYANA IYENGAR, M. O. On the protandry of the flowers of *Aeschynanthus Hookeri* Clarke. Jour. Indian Bot. Soc. 3: 273-274. 2 pl. 1923.—*A. Hookeri* is a common epiphyte in the Darjiling District of the eastern Himalayas. The style is quite short when the flower first opens, it then grows for 5-7 days to full length, while the stamens curl downward over the lower lip of the corolla.—Winfield Dudgeon.

462. VUILLEMIN, PAUL. Adhérence entre deux feuilles ou deux folioles. [Adherence between two leaves or two leaflets.] Compt. Rend. Acad. Sci. Paris 178: 1589-1592. 1924.—"Adherence" is used in the sense defined in a previous paper (see this issue, Entry 464). Leaves united by adherence may be either homotropic, if turned the same way; or antitropic, if turned in opposite ways (the dorsal surface of one adhering to the ventral surface of the other). Homotropic adherence is found in *Impatiens Roylei*. It is back to back in *Rhamnus Frangula*, *Cornus mas*, and *Tradescantia virginica*, and face to face in the orange. Secondary back to back adherence occurs in *Taraxacum officinale*, *Euonymus europaeus*, *Tilia silvestris*, *Tilia platyphylla*, *Viola odorata*, and in the leaflets of *Robinia Pseudo-acacia* and *Sambucus nigra*. Secondary face to face adherence is reported in *Acer Pseudo-platanus*. Antitropic adherence of 2 leaves is primitive in exceptional cases, either by fasciation or by abortion of the terminal bud. Secondary adherence is produced in the course of the development of leaves which are at first coherent.—C. H. Farr.

463. VUILLEMIN, PAUL. Anomalies des feuilles par alloplasie. [Anomalies of leaves due to alloplasia.] Compt. Rend. Acad. Sci. Paris 178: 2036-2038. 1924.—Alloplasia or aberration of development is a source of anomalies of phyllomes, that is, of leaves and homologous members. It may be hyperplasia, producing giant leaves; or hypoplasia, producing dwarf leaves. Local hyperplasia gives rise to emergences of the epidermis, or tumefactions; local hypoplasia, to nodes and dissociation of parts. *Corylus Avellana*, *Tilia silvestris*, *Tropaeolum majus*, *Brassica oleracea*, and *Sarracenia* and other pitcher plants are cited as examples. Alloplasia plays a primary role in the genesis of peltate branches by hyperplasia, and of scyphies and peltiform parts by hypoplasia. Allonasty complicates hyperplasia in the very late production of ascidia and utricles.—C. H. Farr.

464. VUILLEMIN, PAUL. Bifurcation des feuilles par cohérence. [Bifurcation of leaves by coherence.] Compt. Rend. Acad. Sci. Paris 178: 1452-1455. 1924.—Bifurcation is found to result from 4 teretological procedures: dichotomy or division, atrophy of the apex or subtraction, branching or multiplication, and conrescence or addition. The last named may be facial or marginal. If conrescence is facial it is known as "adherence;" if marginal, as "coherence." Coherence is evidenced by 2 leaves uniting by their margins into a tube. It has been reported by Crepin in *Dianthus barbatus* (1865) and by Buchenau in *Funkia caerulea*. It is now reported to occur in *Tulipa Gessneriana*, *Impatiens Roylei*, *Phaseolus vulgaris* and *P. multiflorus*, *Viburnum Lantana*, *Cornus mas*, and *Solidago Virgaurea*. The phyllotactic variations are associated with a change in diameter of the stem, with fasciation, and with torsion producing a grasping effect; and they are the causes of bifurcation in leaves by coherence.—C. H. Farr.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 119, 129, 147, 153, 197, 675, 676, 680, 693, 743, 841)

465. AMOSSÉ, A. Diatomées contenues dans les dépôts calcaires des sources thermales d'Ansirabe (Madagascar). [Diatoms from the hot springs of Ansirabe.] Bull. Mus. Hist. Nat. [Paris] 27: 249-256. Pl. 1. 1921.—The author lists 37 forms of Diatomaceae from the calcareous deposits of the hot springs of Ansirabe, Madagascar, including the following new ones: *Pinnularia Madagascarensis* n. sp.; *P. Madagascarensis* f. *curta* n. f.; *Anomoeoneis* (*Sphaerophora* var.) *Mangini* n. sp.; *A. Malinvaudi* F. Hérib. var. *minor* n. var.; *Caloneis bacillaris* Greg. var. *stauroneiformis* n. var.; *Achnanthes exigua* Grun. var. *capitata* n. var.—John M. Fogg, Jr.

466. BĚLAŘ, K. [Rev. of: RHODES, R. C. Binary fission in *Collodictyon triciliatum* Carter. Univ. California Publ. Zool. 19: 201-274. Pl. 7-14, 4 fig. 1919 (see Bot. Absts. 9, Entry 1370).] Arch. Protistenk. 44: 270. 1922.

467. BĚLAŘ, K. [Rev. of: WETTSTEIN, FRITZ V. Zur Bedeutung der und Technik Reinkultur für Systematik und Floristik der Algen. (The significance and technique of pure cultures for the systematic and floristic study of algae.) Oesterreich. Bot. Zeitschr. 70: 23-29. 1921.] Arch. Protistenk. 44: 148. 1922.

468. DANGEARD, PIERRE. Note préliminaire sur le phytoplancton recueilli au cours de la première Croisière du Pourquoi Pas? en 1922. [Preliminary note on the phytoplankton secured on the first cruise of the "Pourquoi Pas?" in 1922.] Bull. Inst. Oceanogr. Monaco 426: 1-4. 1923.—Numerous plankton collections were made in the region traversed, namely, in the English Channel, upon the Porcupine and Rockall Banks to the West of England, along the Rockall-Faroe path and finally along the return route from the Faroe Isles to the Hebrides and into the Irish Sea and St. George's Channel.—In the surface flora the Peridiniidae occupy an important place because of their extraordinary prevalence. The 3 species *Ceratium tripos*, *C. furca*, and *C. fusus* were taken abundantly in the direction of the Porcupine Banks. The Peridiniidae and especially *Ceratium* appear to be pelagic forms *par excellence*. In the English Channel a small green alga *Halosphaera virides* Schmitz was found in considerable abundance.—Frederick V. Rand.

469. GICKLHORN, JOSEF. Über den Blanglanz zweier neuer Oscillatorien. [The blue luster of two new species of Oscillatoria.] Oesterreich. Bot. Zeitschr. 70: 1-11. Fig. 1-3. 1921.—*Oscillatoria caerulescens* n. sp., and *O. minima* n. sp. are described. [See also this issue, Entry 480].—Frederick V. Rand.

470. HERDMAN, WILLIAM A. Spolia Runiana. V. Summary of results of continuous investigation of the plankton of the Irish Sea during fifteen years. Jour. Linn. Soc. Bot. London 46: 141-170. Pl. 7. 1922.—The paper summarizes results of 15 years study in a single area. A comparatively small number of genera of Diatoms and Copepoda are the dominant organisms and make up the larger part of the phyto-plankton and zoo-plankton respectively. Diatoms were found most evenly distributed during their maximum in March to June. The diatom maximum in spring is probably aided by the winter increase in CO₂ and other raw materials in the sea. The greatest numbers are found at 5-10 fathoms, the depth varying with meteorological conditions.—The accuracy of tow-net catches is discussed. It is not possible to draw numerical conclusions as to population of large sea-areas from few and small samples. The author concludes that plankton distribution in the sea is not uniform.—O. A. Stevens.

471. HOWE, MARSHALL A. Chinese marine algae. Bull. Torrey Bot. Club 51: 133-144. Pl. 1-2. 1924.—A list is given of the known Chinese marine algae, making several additions to those previously recorded and showing a remarkable similarity to the marine algae of the Atlantic Coast of the U. S. A. by including many species identical to both regions. Chor-

daria Chordaria (Harv.) n. comb., *Neurocarpus divaricatus* (Okam.) n. comb., *Lomentaria sinensis* n. sp., *Grateloupia flicina porracea* (Mert.) n. comb., *G. flicina Lomentaria* n. var., and *Nemastoma Coudryi* n. sp. are worthy of nomenclatorial note.—P. A. Munz.

472. KIRBY, H. Morphology and mitosis of *Dinenympha fimbriata* sp. nov. Univ. California Publ. Zool. 26: 199-200. Pl. 19-22. 1924.—The nucleus contains a nucleolus which disappears in mitosis; the chromatin of the resting nucleus appears as granules strung on a linen reticulum. The chromosomes are formed by concentration of these granules into threads; there is no continuous spireme. The chromosomes undergo longitudinal splitting in the prophase, and separate on the spindle in the metaphase. The nuclear membrane does not disappear during mitosis. At the beginning of mitosis the centroblespharoplast gives rise to a centrosome and blepharoplast; each of these divide, the latter into a primary and a secondary blepharoplast. A paradesmose connects the blepharoplasts after their division.—R. P. Hall.

473. KURZ, A. Bemerkenswerte Algen aus der Umgebung von Bern. [Noteworthy algae from the vicinity of Bern.] [Abstract.] Mitteil. Naturf. Ges. Bern 1923: LIV-LVI. 1924.

474. LEBOUR, MARIE V. Plymouth Peridinians. Jour. Marine Biol. Assoc. United Kingdom 12: 795-818. 34 fig. 1922.—The following peridinians are described and figured: *Diplopsalis lenticula* Bergh; *Peridiniopsis* (*Diplopelta*) *asymmetrica* Mangin; *Diplopeltopsis minor* (Pauls.) Pavillard; *Peridiniopsis rotunda* n. sp.; *Entzia* n. gen.; *E. acuta* (= *Diplosalis acuta* Entz) n. comb.; *Eruiella perforata* Gran; and *Phalacroma pulchella* n. sp.—R. P. Hall.

475. MANN, ALBERT. Continuation of investigations . . . on Diatomaceae. Carnegie Inst. Washington Year Book 22: 281-282. 1924.—This is a progress report.—B. E. Livingston.

476. PASCHER, A. Neue oder wenig bekannte Flagellaten. IV. [New or little known flagellates.] Arch. Protistenk. 45: 133-149. 21 fig. 1922.—The following dinoflagellates are described and figured: (1) *Peridinium godlewskii* Woloszynska; (2) *P. dybowski* Wolosz.; (3) *P. kulczynskii* Wolosz.; (4) *P. lubienense* Wolosz.; (5) *P. dzieduszyckii* Wolosz.; (6) *P. polonicum* Wolosz.; (7) *P. tatricum* Wolosz.; (8) *P. tatricum* var. *spinulosa* Wolosz.; (9) *P. wierzejskii* Wolosz.; (10) *P. lomnickii* Wolosz.; (11) *P. lomnickii* var. *splendida* Wolosz.; (12) *P. goslawiense* Wolosz.; (13) *P. marchicum* Lemm. var. *simplex* Wolosz.; (14) *Gonyaulax polonica* Wolosz.; (15) *Chalubinskia tatica* Wolosz.; (16) *Staszicella dinobryonis* Wolosz.; (17) *Glenodiniopsis steinii* Wolosz.; (18) *Glenodinium polonicum* Wolosz.; (19) *Sphaerodinium polonicum* Wolosz.; (20) *Sphaerodinium limneticum* Wolosz.; (21) *Sphaerodinium cracoviense* Wolosz.—R. P. Hall.

477. PASCHER, A. Neue oder wenig bekannte Flagellaten. V. [New or little known flagellates.] Arch. Protistenk. 45: 264-272. 11 fig. 1922.—The following flagellates are described and figured: (1) *Carteria phaseolus* Printz; (2) *Carteria eccentrica* Printz; (3) *Chlamydomonas koishikavensis* Nokano; (4) *Chlamydomonas ampla* Printz; (5) *Chlamydomonas procera* Printz; (6) *Sphenochloris printzii* Pascher; (7) *Sphenochloris urceolata* (Printz) Pascher n. comb.; (8) *Phacus costata* Conrad; (9) *Trachelomonas hystrix* Teiling; (10) *Trachelomonas inconstans* Carter; (11) *Corbicula socialis* Meunier; (12) *Protonotiluca pelagica* Fabre Domergue.—R. P. Hall.

478. PASCHER, A. Neue oder wenig bekannte Flagellaten. VI. [New or little known flagellates.] Arch. Protistenk. 45: 431-439. 2 fig. 1922.—The following species of *Trachelomonas* are described and figured; references to the original descriptions by Swirenko are included: (1) *T. volvocinopsis*, (2) *T. planktonica*, (3) *T. irregularis*, (4) *T. nigra*, (5) *T. pulchra*, (6) *T. robusta*, (7) *T. mirabilis*, (8) *T. superba*, (9) *T. amphora*, (10) *T. orenburgica*, (11) *T. heterospina*, (12) *T. zmjewika*, (13) *T. hexangulata*, (14) *T. tambowica*, (15) *T. longicauda*, (16) *T. mucosa*, (17) *T. pseudobulla*, (18) *T. dubia*, (19) *T. abrupta*, (20) *T. similis* Stokes var. *major*, (21) *T. silvatica*, (22) *T. charkaviensis*.—R. P. Hall.

479. PASCHER, A. [Rev. of: DOFLEIN, F. Die Gattung *Chloramoeba* Bohlin und ihre Stellung in Reiche der Organismen. (The genus *Chloramoeba* Bohlin and its systematic position.)] Acta Zoologica 2: 431-443. 2 pl. 1 fig. 1921.] Arch. Protistenk. 45: 150-152. 1922.

480. PASCHER, A. [Rev. of: GICKLHORN, JOSEF. Über den Blauglanz zweier neuer Oscillarien. (The blue lustre of two new species of *Oscillaria*.) Oesterreich. Bot. Zeitschr. 70: 1-11. Fig. 1-3. 1921 (see this issue, Entry 469).] Arch. Protistenk. 44: 411. 1922.

481. PASCHER, A. [Rev. of: KÜHN, A. *Morphologie der Tiere in Bildern*. 1. Heft: *Flagellaten*. (Morphology of animals in pictures. 1. Flagellates.) 106 p. 201 fig. Gebrüder Bornträger: Berlin, 1921.] Arch. Protistenk. 45: 442-444. 1922.

482. PHILLIPS, REGINALD W. The ceramidium of *Polysiphonia*. New Phytol. 23: 142-149. 14 fig. 1924.—Previous work on the cystocarp of *Polysiphonia* is reviewed, and original observations on *P. violacea* are given. The auxiliary is a daughter cell of the pericentral cell which bears the carpogonial branch, and is cut off after fertilization. The paranematal filaments are not accessory structures, but are the very framework of the wall of the pericarp. After fusion of the zygote with the auxiliary cell, the auxiliary in turn fuses with the pericentral cell, then the cells of the lateral and inferior branches, then the central cell. Finally 3 or 4 of the basal cells of the paranematal axes all fuse to form the parasitic carpo-sporophyte.—I. F. Lewis.

483. SCHILLER, J. Beiträge zur Kenntnis des Pflanzenlebens mitteleuropäischer Gewässer. [Contribution to our knowledge of plant life in the water courses of Central Europe.] Oesterreich. Bot. Zeitschr. 73: 1-22. Pl. 1, fig. 1-11. 1924.—Part 1 gives a description of 3 new forms of the microscopic pond flora, namely: *Trachelomonas biseta* n. sp.; *Tetrastrum heteracanthum* (Nordstedt) Chodat.; and *Characium gracile* n. sp.—Part 2 deals with the life history of *Colacium vesiculosum* Ehrenbg. From a detailed study of the life and habit of this form, it appears that the current opinion concerning the Colacium and the Euglena stages are based on false observations. The Colaceum form should not be considered a special vegetative form of the flagellates. From an ecologic and phylogenetic viewpoint, at least, the genus *Colaceum* is not justified since it is a typical Euglena which lives part of the time free and part of the time attached to members of the Crustaceae.—Part 3 of this paper gives a description of the sexual reproduction in the genus *Characium*.—Ernst Artschwager.

484. SKVORTZOW, B. W. Neue oder wenig gekannte Protisten. XI. Neue oder wenig bekannte Flagellaten. X. Farblose Euglenaceen aus Nord-Mandschurei (China). [Colorless euglenoids from North-Manchuria.] Arch. Protistenk. 48: 180-186. Fig. 1-2. 1924.—The following euglenoids are described and figured: *Astasia dangeardii* Lemm.; *A. inflata* Duj. var. *hyalina* n. var.; *A. elongata* n. sp.; *A. oblonga* n. sp.; *A. variabile* n. sp.; *A. curvata* Klebs; *A. ocellata* Khawkin f.; *A. klebsii* Lemm. f.; *Menoidium pellucidum* Perty; *M. tortuosum* Stokes; *M. falcatum* Zach. var. *minor* n. var.; *M. schewiakoffi* n. sp.; *M. tremulum* n. sp.; *Distigma proteus* Ehrbg.; *Sphenomonas teres* (Stein) Klebs; *Peranema trichophorum* (Ehrbg.) Stein; *Urceolus cyclostomus* (Stein) Mereschk.; *U. alenizini* Mereschk. (?); *U. pascheri* n. sp.; *U. gobii* n. sp.; *Petalomonas angusta* (Klebs) Lemm. f.; *P. angusta* (Klebs) Lemm. var. *ovalis* n. var.; *Heteronema acus* (Ehrbg.) Stein f.; *H. nebulosum* (Duj.) Klebs; *Notosolenus sinuatus* Stokes; *N. orbicularis* Stokes; *Anisonema ovale* Klebs; *A. acinus* Duj.; *Entosiphon ovatum* Stokes.—R. P. Hall.

485. TONI, JOH. BAPT. DE. Sylloge algarum omnium hucusque cognitarum. Vol. 6. Florideae. 767 p. Typis Seminari: Patavii, 1924.—This is the 6th volume in continuation of the monograph begun by de Toni in 1889 (Vol. 1 *Chlorophycearum*, cxxix + 390 p., 1889, gives in addition a literature index by authors, and a list of exsiccati).—Frederick V. Rand.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 86, 87, 128, 186, 1005)

486. ANONYMOUS. Annual meeting of the British Bryological Society, 1923. British Bryological Soc. Rept. 1: 93. 1924.—This meeting was held at Buxton in Derbyshire, and numerous interesting bryophytes were found, 8 mosses and 20 hepatics being particularly mentioned. [See also Bot. Absts. 13, Entry 6646.]—A. W. Evans.

487. ANONYMOUS. Hepatics. British Bryological Soc. Rept. 1: 85-93. 1924.—The specimens of hepatics distributed in 1924 include 134 species. Although the majority were

collected in the British Isles, 34 specimens came from continental Europe and 2 from South America. Critical notes by H. H. K[NIGHT] and D. A. J[ONES] accompany the report.—A. W. Evans.

488. ANONYMOUS. *Sphagna*. British Bryological Soc. Rept. 1: 59-63. 1924.—Except for a few specimens from Belgium the *Sphagna* distributed were all collected in the British Isles. They include 37 species, most of which are represented by 2 or more varieties or forms, 75 new vice-comital records being indicated. The critical notes are by W. R. S[HERRIN].—A. W. Evans.

489. ANONYMOUS. *True mosses*. British Bryological Soc. Rept. 1: 64-84. 1924.—The species of mosses distributed number 339. Most of the specimens came from the British Isles but 91 were collected in France and other parts of continental Europe, 10 in Africa, and 4 in Tasmania and other British colonies. The extra-European species are listed separately. Numerous critical notes by J. C[HARRIER], H. N. D[IXON], J. B. D[UNCAN], D. A. J[ONES], W. E. N[ICHOLSON], G. B. S[AVERY], and J. A. W[Heldon] are interspersed. (See also Bot. Absts. 13, Entry 975.)—A. W. Evans.

490. BEALS, A. T. *How I find Ephemera*. Bryologist 27: 46-49. 2 fig. 1924.—This is a popular account of the way to discover and collect the various species of the moss genus *Ephemerum*, remarkable for their persistent protonema and minute size. Promising localities are described, a list of stations near New York City is given, and the accompanying mosses are noted.—E. B. Chamberlain.

491. BROTHERUS, V. F. *The Musci of the Juan Fernandez Islands*. Nat. Hist. Juan Fernandez & Easter Island 2: 409-448. Pl. 26, 27. 1924.—The author gives a short account of the bryological collections made in the archipelago of Juan Fernandez, the earliest being that of C. Bertero, who visited the island of Masatierra in 1830. A later collection of some interest was made by the botanists of the Challenger Expedition, but the 2 most important collections of all were brought back by C. Skottsberg. The 1st of these, made in 1908, was entrusted to J. Cardot for study but was lost during the German occupation of his home at Charleville, so that his report could not be completed. The 2nd of Skottsberg's collections, made in 1916-17 with the assistance of his wife, forms the basis of the present report, although earlier records are included. The total number of species definitely listed from the archipelago is 129, representing 65 genera and 28 families. Of these 47 are known from Masatierra only and 45 from Masafuera only, the remaining 37 being known from both. The endemic species number 47. In listing the species the author gives full data regarding both local and general distribution and includes a few critical notes. The species and varieties proposed as new, 48 in number, are as follows, Brotherus being the authority for all: *Anacolea subsessilis* var. *brevifolia*, *Breutelia Masafuerae*, *Bryum fernandezianum*, *Campylopus aberrans* with the new var. *viridis*, *C. blindioides*, *C. subareodictyon*, *Cryptodon crassinervis*, *Dicranella costata*, *Dicranoloma capillifolioides*, *D. fernandezianum*, *Didymodon calymperidictyon*, *D. linearis*, *Distichophyllum assimile*, *D. fernandezianum*, *D. subelimbatum*, *Eriopus grandisetis*, *E. leptoloma*, *Fissidens crassicuspes*, *F. fernandezianum*, *F. pycnotylus*, *Grimmia phyllorhizans*, *Isopterygium fernandezianum* with the new var. *longisetum*, *Leptodontium fernandezianum*, *Macromitrium fernandezianum*, *M. Masafuerae*, *Neckera rotundata*, *Oligotrichum canaliculatum* var. *minus*, *Philonotis glabrata*, *P. Krauseana* var. *longinervis*, *P. vagans* var. *evandinervis*, *Pinnatella macrosticha*, *Pterigophyllum tenuinerve*, *Ptychomitrium fernandezianum* var. *majus*, *Ptychomium falciculatum* with the new var. *gracilescens*, *Rhaphidostegium aberrans*, *R. brachycladum*, *R. caespitosoides*, *R. Masafuerae*, *Rigodium robustum*, *Thamnum assimile*, *T. Caroli*, *T. Ingae*, *T. proboscideum*, *Thuidium Masafuerae*, and *T. Valdiviae*. There are in addition 4 new combinations, as follows: *Dicranoloma capillifolium* (Broth.), based on *Leucoloma capillifolium* Broth.; *Porothamnium arbusculans* (C. Müll.), based on *Hypnum arbusculans* C. Müll.; *Thamnum latinerve* (Mitt.), based on *Porotrichum latinerve* Mitt.; and *Thysanomitrium leptodus* (Mitt.), based on *Campylopus leptodus* Mitt. The plates illustrate 16 of the new species.—A. W. Evans.

492. BURRELL, W. H. *Note on Orthodontium*. British Bryological Soc. Rept. 1: 57-58. 1924.—Attention is called to the recently described *O. gracile* var. *heterocarpum* Watson [see Bot. Absts. 13, Entry 3606]. This variety shows some of the characters of *O. lineare* Schwaegr.

(which Brotherus separates generically from *O. gracile*), and it is suggested that the genus be reviewed in order to determine whether or not these characters are stable.—*A. W. Evans.*

493. CHAMBERLAIN, E. B. A new set of exsiccati. Bryologist 27: 56. 1924.—The author calls attention to a new set of exsiccati issued by Edwin B. Bartram under the title "Mosses of southern Arizona." He comments on the interesting character of the collection, particularly from the standpoint of geographical distribution, and lists the 50 species distributed in the first 2 fascicles.—*Author.*

494. DISMIER, G. Première localité française continentale de *Grimmia Hartmani* Schimper, fructifié. [First station in continental France for *Grimmia Hartmani* in fruit.] Bull. Soc. Bot. France 71: 78-81. 1924.—Although widely distributed in Europe (except in the far North) *Grimmia Hartmani* rarely produces capsules. The fruiting plant had been collected in Corsica but was unknown in continental France until discovered by the author near Chambon at an altitude of about 1000 m. In addition to the new French locality he cites stations in Bulgaria, Greece, Hungary, Montenegro, Norway, Sicily, Switzerland, and the U. S. A. (Idaho).—*A. W. Evans.*

495. DISMIER, G. *Stereodon Haldanei* Lindberg et *Alicularia compressa* (Hooker) Nees: deux nouveautés bryologiques pour le flore vosgienne. [*Stereodon Haldanei* et *Alicularia compressa*: two bryological novelties for the flora of the Vosges Mountains.] Bull. Soc. Bot. France 66: 371-373. 1919.—The author announces his discovery of the moss *Stereodon Haldanei* and the hepatic *Alicularia compressa* in the vicinity of Plombières-les-Bains, a town in the Vosges Mountains of eastern France. He gives other French stations for each species and shows that the center of distribution of the *Stereodon* is in Central Europe.—*A. W. Evans.*

496. DIXON, H. N. Dr. Stirton's new British mosses revised. Jour. Botany 61: 10-17, 46-52, 69-75. 1923.—During the period from 1870-1915 the late James Stirton proposed a large number of new species of British mosses. The author has critically examined the specimens upon which these new species were based and reaches the conclusion that all except 3 ought to be reduced to synonymy. Of these 3, *Barbula limosella* is recognized as a valid species but the other 2 are reduced in rank, *Barbula chlorophana* becoming *Grimmia apocarpa* subsp. *G. gracilis* var. *chlorophana* (Stirton) Dixon and *Bryum rubicundum* being regarded as a subspecies of *B. capillare* L. A list of Stirton's remaining species follows, Dixon's interpretation of each being given in parentheses: *Amblystegium geophilum* (*Hypnum chrysophyllum* var. *erectum* Bagn.), *A. perminium* (*A. serpens* var. *salinum* Carr.), *Anoetangium marinum* (*A. compactum* var. *pellucidum* [Wils.] Dixon), *Barbula aggregata* (*Trichostomum fragile* [Drumm.] Dixon), *B. ferruginascens* (*B. rubella* var. *ruberrima* Braithw.), *B. incavata* (*Weisia rupestris* var. *compacta* B. & S.), *B. limosa* (a form of *Trichostomum flavovirens* Bruch), *B. viridescens* (*B. vinealis* Brid.), *Bartramia subvirella* (a form of *Breutelia arcuata* [Dicks.] Schimp.), *Bryum elegantulum* (*B. atropurpureum* var. *gracilentum* Tayl.), *B. intortulum* (a form of *B. pseudotriquetrum* Schwaegr.), *B. leptaleum* (*B. capillare* var. *elegans* [Nees] Braithw), *B. parasemum* (a form of *B. argenteum* L. or *B. atropurpureum* W. & M.), *B. perpusillum* (*B. argenteum* var. *majus* B. & S.), *B. rubicosum* (*B. pallens* var. *speciosum* Schimp.), *Campylopus aureascens* (*C. brevipilus* var. *auriculatus* Ferg.), *C. brevipilus* var. *attenuatus* (a form of *C. brevipilus* B. & S.), *C. brevipilus* subsp. *C. pelidinus* (*C. brevipilus*), *C. citrescens* (*C. fragilis* [Dicks.] B. & S.), *C. crenulatus* (a form of *C. flexuosus* [L.] Brid.), *C. Fergussonii* (a form of *C. atrovirens* De Not.), *C. fulvo-viridis* (*C. brevipilus*), *C. fusco-luteus* (*C. subulatus* var. *elongatus* Bosw.), *C. leucophaeus* (*C. flexuosus* var. *paradoxus* [Wils.] Husn.), *C. melaphanus* (*C. flexuosus*), *C. obtectus* (*C. flexuosus* var. *paradoxus*), *C. pergracilis* (a robust form of *C. pyriiformis* [Schultz] Brid.), *C. perplexans* (*C. atrovirens*), *C. porophorus* (*C. setifolius* Wils.), *C. prasino-rufus* (*C. atrovirens* var. *muticus* Milde), *C. purpurascens* (*C. Schwarzii* Schimp.), *C. rubiginosus* (a form of *C. flexuosus* var. *paradoxus*), *C. subcinereus* (a form intermediate between *C. pyriiformis* and *C. flexuosus*), *C. symplectus* (*C. Schwarzii*), *Conostomum* (?) *extenuatum* (*Ditrichum zonatum* [Funck] Limpr.), *Ceratodon vialis* (*C. purpureus* [L.] Brid.), *Climacium epigaeum* (*C. dendroides* [L.] W. & M.), *Cynodontium asperellum* (*Weisia curvirostris* var. *scabra* [Lindb.] Dixon), *Dichodontium fulvescens* (*D. flavesces* [Dicks.] Lindb.), *Dicranella fusco-atra* (*D. heteromalla* Schimp.), *Dicranoweisia Sutherlandii* (*D. cirrata* [L.] Lindb.), *Dicranum capnodes* (*D. uncinatum* [Harv.] C. M.), *D. expallidum* (*Campylopus subulatus*

var. *elongatus*), *D. Fergussoni* (a form of *D. fuscescens* Turn.), *D. hypselum* (*D. molle* Wils.), *D. interludens* (*D. Bonjeani* De Not.), *D. leiophyllum* (a form of *Dicranoweisia crispula* [Hedw.] Lindb.), *D. mediellum* (a derivative form of *D. falcatum* Hedw.), *D. notabile* (*Dicranodontium longirostre* [Starke] B. & S.), *D. subnitescens* (*D. Scottianum* Turn.), *Didymodon turgescens* (*Zygodon lapponicus* [Hedw.] B. & S.), *Grimmia calvescens* (*Racomitrium heterostichum* var. *alopecurum* Hüb.), *G. fuliginea* (a form of *G. trichophylla* Grev.), *G. fusco-viridis* (*Racomitrium heterostichum* var. *alopecurum*), *G. halophila* (a species of *Ceratodon*, probably *C. conicus* Lindb.), *G. hemipolia* (*G. ovata* Schwaegr.), *G. Horni* (a small form of *G. funalis* [Schwaegr.] B. & S.), *G. inaequalis* (*G. subsquarrosa* Wils.), *G. papillulata* (a form of *Racomitrium heterostichum* var. *alopecurum*), *G. platyphylla* (a form of *G. apocarpa* [L.] Hedw.), *G. polita* (a form of *G. trichophylla*), *G. rubescens* (*G. trichophylla*), *G. subaquila* (*G. decipiens* [Schultz] Lindb.), *G. sublurida* (a form of *Racomitrium heterostichum* var. *gracilescens* B. & S., already reduced by Braithwaite), *G. undulata* (a form of *G. trichophylla*), *Hypnum amoenum* (an alpine form of *Brachythecium rivulare* [Bruch] B. & S.), *H. annotinum* (*Plagiothecium denticulatum* var. *obtusifolium* Hook. & Tayl.), *H. anomalum* (*Eurhynchium Swartzii* [Turn.] Hobkirk), *H. corrugatum* (a form of *H. triquetrum* L.), *H. deflectens* (a form of *H. cupressiforme* L.), *H. intermixtum* (*Brachythecium paradoxum* [H. f. & W.] Jaeg., a New Zealand species), *H. intortum* (a form of *H. molluscum* Hedw.), *H. proectum* (forms of *H. molluscum*), *H. recurvulum* (*Ceratodon purpureus*), *H. teichophyllum* (*H. cupressiforme*), *Isothecium interludens* (*Eurhynchium myosuroides* var. *brachythecioides* Dixon), *I. persimile* (*Camptochaete gracilis* [H. f. & W.] Par., a New Zealand species), *I. subglaciale* (a form of *Eurhynchium myosuroides* [L.] Schimp.), *I. symmictum* (a form of *Brachythecium plumosum* [Swartz] B. & S.), *Leptodontium Rosii* (a form of *Rhabdoweisia crepulata* Jameson), *Leptotrichum compactum* (*Ditrichum flexicaule* var. *densum* B. & S.), *L. confertum* (*D. homomallum* var. *zonatum* [Funck] Lindb.), *L. cyclophyllum* (a form of *Dicranella heteromalla* var. *interrupta* B. & S.), *L. infuscatum* (*Ditrichum flexicaule* [Schleich.] Hampe), *Limneria viridula* (*Barbula spadicea* Mitt.), *Mollia conspersa* (*Trichostomum mutabile* Bruch), *M. Haggartii* (*Diphyscium foliosum* Mohr), *M. intumescens* (a form of *Trichostomum mutabile*), *M. laxula* (*Barbula rubella* [Hoffm.] Mitt.), *M. scaphoidea* (*Trichostomum crispulum* var. *elatum* Schimp.), *M. subbifaria* (*T. flavovirens*), *M. terrena* (*T. tenuirostre* var. *Holtii* Braithw.), *M. thrausta* (*T. tortuosum* var. *fragilifolium* [Juratz.] Dixon), *Oligotrichum exiguum* (*O. hercynicum* [Ehrh.] Lam.), *Orthotrichum praenubulum* (*O. stramineum* Hornsch.), *O. prasinellum* (*O. tenellum* Bruch), *Philonotis heterophylla* (*P. adpressa* Ferg.), *Plagiothecium Kinlayanum* (*P. denticulatum* var. *obtusifolium*), *P. rufo-virescens* (*P. denticulatum* [L.] B. & S.), *P. trichodeum* (a form of *P. denticulatum*), *Pohlia tenerrima* (*Archidium alternifolium* [Dicks.] Schimp.), *Pterogonium gracile* var. *punctellum* (not a distinct variety), *Racomitrium consocians* (the hairless form of *R. canescens* Brid.), *R. divergens* (*R. ramulosum* Lindb.), *R. heterostichum* var. *amphyphyllum* (var. *alopecurum*), *Schistidium nodulosum* (*Grimmia apocarpa* var. *gracilis*), *Timmia scotica* (a form of *T. norvegica* Zett.), *Trichostomum episemum* (a form of *T. mutabile* var. *littorale* [Mitt.] Dixon,) and *Zygodon teichophyllus* (*Z. Stirtoni* Schimp.).—A. W. Evans.

497. DOUIN, CH. *Recherches sur le gametophyte des Marchantiées*. [Investigations concerning the gametophyte of Marchantiae.] Rev. Gén. Bot. 35: 487-537. Fig. 77-107. 1923.—The first 2 parts of this paper have been abstracted (see Bot. Absts. 13, Entry 1812). In this, the 3rd and last part, the author discusses the development of the sterile thallus in the Marchantiae and of leaves and other lateral organs in the bryophytes as a whole. Throughout the Marchantiae the thallus shows a single apical cell with 4 cutting faces, giving rise to 4 rows of segments or secondary initials, 2 lateral, 1 dorsal and 1 ventral. Each secondary initial develops into a definite portion of the adult thallus, to which the name "merophyte" is given. The thallus thus consists of 4 rows of merophytes, corresponding with the 4 rows of secondary initials. The development of each merophyte takes place simultaneously and in close union with that of the bounding merophytes, and the thallus in consequence forms a continuous whole. In the development of leaves the author denies the existence of apical growth, even for a short period, although the presence of an apical cell has been repeatedly affirmed. He produces evidence to show that the development is

basal from the very beginning, that the basal initials are numerous, and that they function simultaneously and in close union, thus giving rise to expansions of cells. He applies his explanation not only to leaves but to perianths, involucre, cupules, ventral scales, and sexual organs.—A. W. Evans.

498. EVANS, ALEXANDER W. Report on the Hepaticae of Nebraska. *Bryologist* 27: 49-52. 1924.—The author gives an annotated list of 16 species (8 Marchantiales, 4 Jungermanniales, and 4 Anthocerotales), together with comments on the previous reports of hepatics from Nebraska and citations of the literature. All but 3 of the species listed are thallose.—E. B. Chamberlain.

499. HOLZINGER [J. M.], AND [E. B.] BARTRAM. A correction. *Bryologist* 27: 54. 1924.—The authors note that the sectional name *Pseudocrossidium*, which they proposed in their recent paper on *Crossidium* [see Bot. Absts. 13, Entry 4370], was already in use. They therefore change the name of their Section II to *Paenecrossidium*.—E. B. Chamberlain.

500. MEDELIUS, SIGFRID. *Rhynchostegiella compacta* en för Skandinavien ny lövmossa och dess systematiska ställning. [Rhynchostegiella compacta, a moss new to Scandinavia, and its systematic position.] *Bot. Notiser* 1922: 237-244. *Fig. 1-7*. 1922.—The author announces the discovery of *Rhynchostegiella compacta* (C. Müll.) Loeske in Sweden, basing his record on specimens collected in 1872 by J. E. Zetterstedt at Hoburg, on the island of Gotland. He gives an account of the history of the species, describes its characteristic features and lists its numerous synonyms. With regard to its systematic position he follows Loeske, who was the 1st to transfer C. Müller's *Hypnum compactum* to the genus *Rhynchostegiella* of Limplricht. Earlier writers had placed it in *Amblystegium*, *Brachythecium* or *Eurhynchium*. The species reproduces vegetatively by means of slender gemmae borne on the midrib of a leaf and usually on the lower surface. Each consists of a short row of cells. At the close of the paper the author cites specimens from Austria, Bavaria, France, Latvia, Mexico, and Switzerland.—C. J. Hylander.

501. MEYLAN, CH. Les hépatiques de la Suisse. [Hepaticae of Switzerland.] *Beiträge Kryptogamenfl. Schweiz* 6: 1-318. *Fig. 1-213*. 1924.—In the opening chapter the author gives an account of the work already done on the Hepaticae of Switzerland, including a list of published articles. He follows this by an illustrated lexicon of the various descriptive terms employed and by chapters dealing with the biology of the group, with the variability of the specific characters in certain cases, with associations of Hepaticae in the ecological sense, with an analysis of the Swiss hepatic flora, with a discussion of characteristic regions in Switzerland where hepatics flourish, and with directions for the collection and study of specimens. In the descriptive part of the volume, which occupies the majority of the pages, he recognizes 240 species, about 10% of which are said to be calciphilous, about 70% calcifugous and the rest indifferent, so far as the presence or absence of lime salts in the substratum is concerned. He distinguishes these species largely by means of analytical keys but characterizes more fully the genera and higher groups. Under each species he gives more or less definite data regarding the distribution in Switzerland. In the classification of his material he 1st divides the Hepaticae into the 3 subclasses: Marchantiales, Jungermanniales and Anthocerotales, the last with a single genus and 5 species. The Marchantiales he subdivides into 2 cohorts: the Ricciaceae, with 3 genera and 13 species; and the Marchantiaceae, further divided into the Corsinieae (1 genus, 1 species), the Targionieae (1 genus, 1 species), and the Marchantieae (10 genera, 16 species). The Jungermanniales he subdivides into the cohorts Jungermanniaceae anacrogynae and acrogynae. The 1st he divides further into the suborders Anelaterae (2 tribes, 2 genera, 2 species), and Elaterae (6 tribes, 8 genera, 24 species). The Jungermanniaceae acrogynae he 1st divides into the suborders Jungermannieae and Jubuleae, the latter with 2 genera and 7 species. The large group of the Jungermannieae, which includes most of the leafy species of the Swiss flora he subdivides into the following families: Epigoniantheae (21 genera, 85 species); Trigonantheae (11 genera, 43 species); Ptilioideae (5 genera, 7 species); Scapanioideae (2 genera, 28 species); Raduloideae (1 genus, 2 species); and Madothecoideae (1 genus, 5 species). He emphasizes the artificial character of certain of his groups, particularly the Epigoniantheae and the Trigonantheae, suggesting that they ought to be split up still further; and he carries out this suggestion in the case of the Tri-

gonanthaeae, subdividing it into the Cephalozieae, Cephalozielleae, Calypogeieae, and Lepidozieae. In addition to the species definitely known in Switzerland he calls attention to those which are to be looked for within the Swiss boundaries. The following are reported for the 1st time from Swiss territory: *Cephaloziella bifidioides* Douin, *Lophozia atlantica* (Kaalas) K. Müll., *Marchantia paleacea* Bertol., *Riccia ligula* Steph., and *Scapania vexata* C. Massal. The genus *Cladopus* (Spruce), based on Spruce's section *Cladopus* of the genus *Cephalozia*, is proposed as new, necessitating 2 new combinations: *C. fluitans* (Nees), based on *Jungermannia fluitans* Nees; and *C. Francisci* (Hook.), based on *J. Francisci* Hook. In addition the following new species, subspecies, varieties, and combinations are proposed: *Calypogeia sphagnicola* var. *autumnalis*; *Chiloscyphus polyanthus* subsp. *C. pallescens* (Ehrh.), based on *J. pallescens* Ehrh.; *Grimaldia controversa*, *G. fragrans* var. *alpina*; *Lophozia Hatcheri* var. *palmatifolia*; *L. lycopodioides* var. *obtusiloba*; *L. Muelleri* var. *longicuspis*; *L. porphyroleuca* var. *guttulata* (Lindb. & Arn.), based on *J. guttulata* Lindb. & Arn.; *L. quadriloba* var. *acutiloba*; *Marsupella emarginata* subsp. *M. aquatica* (Lindenb.), based on *J. emarginata* var. *aquatica* Lindenb.; *M. ustulata* subsp. *M. Sprucei* (Limpr.), based on *Sarcoscyphus Sprucei* Limpr.; *Pleuroschisma tricenatum* subsp. *P. implexum* (Nees), based on *Herpetium deflexum* β. *implexum* Nees; and *Tritomaria scitula* (Tayl.), based on *J. scitula* Tayl. Other interesting features of the work from the standpoint of taxonomy are the following: the revival of the genus *Liochlaena* Nees; the retention of the generic name *Jungermannia* for the single species, *J. polita* Nees; the interpretation of *Scapania helvetica* Gottsche and *S. obliqua* (Arn.) Schiffn. as aggregates of convergent forms, rather than as valid species. Most of the species recognized are figured.—A. W. Evans.

502. NICHOLSON, W. E. Note on *Scapania Degenii* (Schiffn. M. S.) K. Müll. British Bryological Soc. Rept. 1: 58-59. 1924.—The author gives a brief historical and descriptive account of this recently described species, comparing it with *S. aspera* Bernet. It was originally described from specimens collected by A. von Degen in the Tyrol but had already been collected in Scotland and has since been found in Switzerland.—A. W. Evans.

503. PAUL, H. *Hypnum turgescens* T. Jens. Eine systematisch-geographische Studie. [Hypnum turgescens. A systematic-geographical study.] Krypt. Forsch. Bayer. Bot. Ges. 6: 408-419. Fig. 1-8. 1924.—The greater part of this paper, which was published in 1918 in an incomplete form, has been abstracted (see Bot. Absts. 12, Entry 1944). In the concluding pages the author continues his discussion of the deciduous apical buds of *Scorpidium turgescens* (T. Jens.) Loeske (*Hypnum turgescens* T. Jens.), as a means of vegetative reproduction. In his opinion water is the chief agent of distribution, although wind and water-birds may play a subordinate part.—A. W. Evans.

504. PAUL, H. Neue Beiträge zur Moosflora Bayerns. [New contributions to the moss flora of Bavaria.] Krypt. Forsch. Bayer. Bot. Ges. 6: 420-424. 1924.—The author reports the following hepatics and mosses for the 1st time from Bavaria, citing a definite station in each case: *Anoetangium compactum* Schwgr., *Fissidens rufulus* Br. Eur., *Lophozia Kaurini* (Limpr.) St., *Orthotrichum Limprichtii* Hag., *Pseudoleskea Breidlerii* Kindb., *Schistidium teretinerve* Limpr., and *Sphaerocarpus terrestris* (Mich.) Sm. He gives in addition new Bavarian stations for 12 other hepatics and 56 mosses.—A. W. Evans.

505. SCHADE, A. Die Lebermoose Sachsens. [Liverworts of Saxony.] Abhandl. Naturwiss. Ges. Isis Dresden 1922-1923: 1-70. 1923.—The work represents a study preliminary to a proposed liverwort flora of Saxony. The author 1st gives an account of the portion of eastern Germany investigated and of the work already done on its Hepaticae, listing the published contributions and exsiccati. This is followed by an enumeration of the 156 species definitely reported from the region, each species being accompanied by a citation of stations, collectors' names and dates of collection. The species reported since the publication of Rabenhorst's Kryptogamen-Flora in 1863 are marked with asterisks and number 63, representing a gain of about 40%. Several of the species listed are accompanied by critical remarks, and the following new varieties or combinations are proposed: *Cephaloziella phyllacantha* var. *intermedia*; *Haplozia pumila* var. *Zeyheri* (Hüb.) (Hüb.), based on *Jungermannia Zeyheri* Hüb.; and *Hygrobiella laxifolia* var. *Notarisiana* (C. Massal.), based on *Cephalozia Notarisiana* C. Massal.

At the close of the paper the hepatic flora of Saxony is analyzed according to the local distribution of the various species in the region, and certain selected species are considered from the standpoint of vertical or general distribution.—A. W. Evans.

506. STEPHANI, FRANZ. *Species Hepaticarum*. Vol. 6. P. 177-240. 1921.—The present instalment of this extensive work (see Bot. Absts. 13, Entry 7803) continues the treatment of *Plagiochila* and describes 192 species, distributed as follows: Europe, 2; Asia, 45; Africa, 19; tropical North America, 14; South America, 73; Pacific Islands (including Australia), 39. The following are apparently described for the 1st time, Stephani being the authority unless otherwise noted: *Plagiochila litoralis* (New Zealand), *P. longicauda* (Cameroons), *P. longifolia* (Malacca), *P. lutescens* (Brazil), *P. Lüthiana* (India), *P. Lützelburgii* (Brazil), *P. madens* (New Guinea), *P. madurensis* (India), *P. Maireana* (China), *P. mannakeana* (Hawaii), *P. marriensis* (Hawaii), *P. matanga* (Ecuador), *P. Merrillana* (Philippine Islands), *P. mexicana* (Mexico), *P. minutifolia* (New Caledonia), *P. moluccensis* (Hawaii), *P. muensis* (New Caledonia), *P. multidentata* (New Zealand), *P. nahikuna* (Japan), *P. nana* (India), *P. Neutiana* (Ceylon), *P. nigrescens* (New Caledonia), *P. nilgherriensis* (India), *P. nova* (Ecuador), *P. Nymanii* (New Guinea), *P. oahuensis* (Hawaii), *P. oblongotrigona* (Fernando Po), *P. Okamura* (Japan), *P. ovato-obconica* (Colombia), *P. ovifolia* (Colombia), *P. pallide-virens* (East Africa), *P. paludosa* (Ecuador), *P. paradoxa* Schiffn. (India), *P. Parisii* (New Caledonia), *P. Parkinsonii* (New Caledonia), *P. pastasensis* (Brazil), *P. Pearsoni* (East Africa), *P. pembayana* (New Caledonia), *P. pendula* (Ecuador), *P. penicillata* (Guiana), *P. perakensis* (Perak), *P. permagna* (India), *P. pilifera* (New Caledonia), *P. pinnatidens* (Ecuador), *P. Pitardii* (Teneriffe), *P. plicatula* (Philippine Islands), *P. potrerillana* (Ecuador), *P. pulchra* (New Caledonia), *P. pungens* (Ecuador), *P. quadriseta* (Japan), *P. ramentacea* (Ivory Coast), *P. ramenticaulis* (Ceylon), *P. Rechingeri* (Samoa), *P. remotistipula* (India), *P. Remyana* (Australia), *P. rhombifolia* (Borneo), *P. rigidissima* (New Caledonia), *P. rikuzana* (Japan), *P. Rivana* (Somaliland), *P. rivularis* (Cameroons), *P. Rockii* (Hawaii), *P. rosariensis* (Ecuador), *P. ruficaulis* (Costa Rica), *P. rupicola* (India), *P. sabensis* (Surinam), *P. sacramenti* (Ecuador), *P. Saettoni* De Not. (Ecuador), *P. saladona* (Ecuador), *P. sanguinea* (New Caledonia), *P. Saveziana* (New Caledonia), *P. Schauliana* (India), *P. Schubertiana* (Chile), *P. scopulosa* (Ecuador), *P. scotica* Macvicar (Scotland and the Azores Islands), *P. semiaperta* Schiffn. (India), *P. sendaica* (Japan), *P. shangaica* (China), *P. shinanoensis* (Japan), *P. simillana* (Sumatra), *P. sisparensis* (India), *P. solitaria* Gottsche (Jamaica), *P. solax* (Guatemala), *P. spinosissima* (Java), *P. squarrosa* (Juan Fernandez), *P. squarrosifolia* (Cameroons), *P. Stahlitii* (Cameroons), *P. stipata* (Argentina), *P. stipulifera* (Philippine Islands), *P. subangulata* (New Caledonia), *P. subatra* (Mexico), *P. suberispula* (Cameroons), *P. subdensispina* (Java), *P. subflorida* (Granada), *P. subgedena* (New Caledonia), *P. subligulata* (Brazil), *P. sublinearis* (Chile), *P. subnuda* (Bolivia), *P. subopposita* (New Caledonia), *P. subpilifolia* (Mexico), *P. subpropinqua* (India), *P. subrepanda* (Cameroons), *P. subsymmetrica* (India), *P. Suringarii* (Surinam), *P. taetera* (New Caledonia), *P. tamiensis* (New Guinea), *P. taona* (New Caledonia), *P. tenera* (Costa Rica), *P. tenerrima* (Peru), *P. tenuicaulis* (New Caledonia), *P. tenuispica* (Grenada), *P. tenuitexta* (Tahiti), *P. terricola* (Java), *P. Thériotiana* (New Caledonia), *P. thylianthoides* (Japan), *P. Tonduzana* (Costa Rica), *P. tongtschuana* (China), *P. tonkinensis* (Tonkin), *P. tortifolia* (Borneo), *P. tosana* (Japan), *P. toshoguna* (Japan), *P. tricuspis* (San Thomé), *P. tridens* (Perak), *P. trifida* (Galapagos Islands), *P. trigona* (New Caledonia), *P. trochantha* (India), *P. Türckheimii* (Guatemala), *P. umbrosa* (Mexico), *P. Uhligii* (East Africa), *P. ubangiensis* (Ubangi), *P. vagans* (New Caledonia), *P. verapazana* (Guatemala), *P. vexans* Schiffn. (India), *P. villosa* (Java), *P. viridis* (Guatemala), *P. viridissima* (New Caledonia), *P. vittifolia* (Barbados), *P. vulgarifolia* (New Caledonia), *P. vygensis* (India), *P. Wattsiana* (Australia), and *P. Wilmsiana* (South Africa). Of these species *P. Remyana* and *P. rhombifolia* are homonyms, there being an earlier *P. Remyana* Steph. from Hawaii and an earlier *P. rhombifolia* Steph. from Costa Rica.—A. W. Evans.

507. STEPHANI, FRANZ. *Species Hepaticarum*. Vol. 6. P. 241-368. 1922.—In the 8 signatures of this work here abstracted the treatment of the large genus *Plagiochila* is concluded, 11 species being described, and the following genera (in the given sequence) are taken up, the number of species described being indicated in each case: *Tylimanthus*, 29; *Leio-*

scyphus, 12; *Gongylanthus*, 1; *Lophocolea*, 111; *Harpanthus*, 1; *Chiloscyphus*, 38; *Saccogyma*, 4; *Jackiella*, 1; *Zoopsis*, 2; *Lepidozia*, 79; *Arachniopsis*, 2; *Chandonanthus*, 4; *Herpocladium*, 2; *Isotachis*, 20; *Schisma*, 15; *Lepicolea*, 8; and *Mastigophora*, 8. The treatment of the last genus is incomplete. The geographical distribution of the species is as follows: Europe, 1; Asia, 58; Africa, 29; tropical North America, 11; South America, 132; Pacific Islands (including Australia), 117. The following are apparently described for the 1st time, Stephani being the authority unless otherwise noted: *Arachniopsis capillacea* (Brazil), *A. madagascariensis* (Madagascar); *Chandonanthus fragillimus* (Philippine Islands), *C. Houyanus* (New Guinea), *Chiloscyphus acutus* (New Caledonia), *C. bomboizanus* (Ecuador), *C. confertifolius* (New Caledonia), *C. confertus* (New Caledonia), *C. constipulus* (New Zealand), *C. cornutistipulus* (New Caledonia), *C. Ernstianus* (Sumatra), *C. Fleischeri* (Ceylon), *C. Francana* (New Caledonia), *C. giganteus* (New Caledonia), *C. heterophyllus* (Tasmania), *C. hispidus* (New Zealand), *C. inflatistipulus* (Australia), *C. javanicus* (Java), *C. Kilanensis* (Hawaii), *C. laceratus* (Hawaii), *C. latistipus* (New Caledonia), *C. longifissus* (New Caledonia), *C. merapiensis* (Sumatra), *C. microstipulus* (Japan), *C. Novae-Guineae* (New Guinea), *C. parvistipulus* (Mexico), *C. purpureus* (Ecuador), *C. quadricilius* (New Caledonia), *C. ramosus* (New Caledonia), *C. rotundifolius* (New Caledonia), *C. simillimus* (Tasmania), *C. subsimilis* (New Caledonia), *C. Thériotii* (New Caledonia), *C. tridens* (Singapore), *C. trigonifolius* (New Caledonia), *Gongylanthus Leratae* (New Caledonia), *Harpanthus acutiflorus* (Japan), *Herpocladium sikkimense* (India), *Isotachis Allionii* (Ecuador), *I. ecuadorensis* (Ecuador), *I. obtusa* (Ecuador), *I. rupicola* (New Caledonia), *Jackiella unica* (Caroline Islands), *Leioscyphus ecuadorensis* (Ecuador), *L. heterophyllus* (Australia), *L. irregularis* (New Zealand), *Lepicolea fissa* (Java), *L. flaccida* (Java), *L. longifissa* (New Zealand), *L. Lorianae* (New Guinea), *Lepidozia aequiloba* (Brazil), *L. africana* (Mauritius), *L. Allionii* (Ecuador), *L. apiculiloba* (Bolivia), *L. augustana* (New Guinea), *L. bicalcarata* (Colombia), *L. bisetula* (New Caledonia), *L. capilliramea* (Chile), *L. caracensis* (Venezuela), *L. chilensis* (Chile), *L. cordistipula* (New Guinea), *L. coreana* (Corea), *L. Cunninghamii* (Colombia), *L. effusiseta* (Juan Fernandez), *L. expansa* (Philippine Islands), *L. gedena* (Java), *L. Gibbsiana* (New Zealand), *L. Hariotii* (Terra del Fuego), *L. heterotexta* (New Caledonia), *L. Husnoti* (Chile), *L. integristipula* (New Zealand), *L. Kaulfussiana* (Bolivia), *L. kogiana* (New Caledonia), *L. lacerifolia* (New Guinea), *L. Leratae Paris* (New Caledonia), *L. Leratii* (New Caledonia), *L. Lorianae* (New Guinea), *L. microscopica* (Chile), *L. minima* (India), *L. minutifolia* (Hawaii), *L. obcuneata* (Peru), *L. palmicola* (New Guinea), *L. pandana* (New Guinea), *L. parvifolia* (New Caledonia), *L. paschalis* (Easter Island), *L. paucidens* (Java), *L. paupercula* (New Caledonia), *L. pusilla* (Hawaii), *L. quadricilia* (Australia), *L. Quintasii* (San Thomé), *L. radiata* (New Zealand), *L. rigida* (New Hebrides), *L. sikkimensis* (India), *L. squamifolia* (Borneo and Java), *L. subquadrata* (New Zealand), *L. tenuicuspis* (Bolivia and Ecuador), *L. Thériotii* (New Caledonia), *L. triangulifolia* (Philippine Islands), *L. tricuspidata* (Java), *L. trifida* (New Caledonia), *L. Tunguraguae* (Colombia), *Lophocolea anomala* (New Guinea), *L. augustiflora* (Japan), *L. augustistipula* (St. Helena), (Philippine Islands), *L. tricuspidata* (Java), *L. trifida* (New Caledonia), *L. Tunguraguae* (Colombia), *Lophocolea anomala* (New Guinea), *L. augustiflora* (Japan), *L. augustistipula* (St. Helena), *L. Ascensionis* (Ascension Island), *L. aucklandica* (New Zealand), *L. autoica* (New Caledonia and Hawaii), *L. Beckettiana* (New Zealand), *L. biscuspidata* (Hawaii), *L. bifidistipula* (Mexico), *L. bootanensis* (India), *L. Boulyana* (Java), *L. brevis* (Tasmania), *L. caledonica* (New Caledonia), *L. corticola* (Australia), *L. crassicaulis* (New Caledonia), *L. crenulifolia* (Java), *L. cucullifolia* (Chile), *L. Fauriana* (Japan), *L. fissicalyx* (Japan), *L. flavicans* (New Guinea), *L. fragillima* (New Caledonia), *L. fulva* (Australia), *L. Griffithiana* (tropical Asia), *L. heterodonta* (Philippine Islands), *L. heteromorpha* (New Caledonia), *L. hirafusa* (Japan), *L. inflexifolia* (New Zealand), *L. Kehdingiana* (Sumatra), *L. kurguelensis* Gottsche (Kerguelen Island), *L. Koyasana* (Japan), *L. laceristipula* (Mexico), *L. lancistipula* (Japan), *L. latistipula* (New Caledonia), *L. Ledermannii* (New Guinea), *L. Lillieana* (East Africa), *L. maluana* (New Guinea), *L. marginata* (Ecuador), *L. minutistipula* (Mexico), *L. Muenchiana* (Mexico), *L. multispinula* (Patagonia), *L. neglecta* Jack (Japan), *L. Newelliana* (Hawaii), *L. normalis* (New Zealand), *L. occidentalis* (West Africa), *L. papulosa* (New Caledonia), *L. parva* (New Caledonia), *L. parvistipula* (Birma), *L. pilistipula* (New

Caledonia), *L. platensis* (Argentina), *L. purpurea* (New Caledonia), *L. pusilla* (Hawaii), *L. rara* (Tasmania), *L. rhombifolia* (Japan), *L. rupicola* (New Guinea), *L. sendaica* (Japan), *L. setistipa* (Japan), *L. sexdentata* (Tasmania), *L. siamensis* (Siam), *L. Sintenisi* (Porto Rico), *L. subcostata* (New Caledonia), *L. tamina* (New Guinea), *L. tenax* (New Zealand), *L. Thériotii* (Cuba), *L. Thomsoni* (India), *L. trispinosa* (Hawaii), *L. umida* (New Guinea), *L. unduliflora* Gottsche (New Zealand), *L. Velleana* (India), *L. villosa* (New Zealand), *Mastigophora appendiculata* (New Guinea), *M. exappendiculata* (New Caledonia), *M. gracillima* (Philippine Islands), *M. heterophylla* (Java), *M. parvifolia* (Hawaii), *M. sikkimensis* (India), *Plagiochila brunneo-viridis* (New Guinea), *P. cucullifolia* (New Guinea), *P. pandanicola* (New Guinea), *P. Schraderbergeri* (New Guinea), *P. Stolzii* (East Africa), *P. subgunniana* (New Guinea), *P. vestustisilva* (New Guinea), *P. Wakawana* (Japan), *P. Wilsoniana* (China), *P. Winteri* (Java), *P. Yoshinagana* (Bolivia), *Saccogyna armata* (New Guinea), *S. subacuta* (Mexico), *S. subalternifolia* (India), *S. tridens* (New Guinea), *Schisma Colombiae* (Colombia), *S. evittatum* (New Guinea), *S. Fleischeri* (India), *S. fragile* (India), *S. gracile* (India), *S. himalayana* (India), *S. Leratii* (New Caledonia), *S. Parisii* (New Caledonia, Hawaii and India), *S. pinnatum* (India), *S. pusillum* (Corea), *S. setigerum* (New Caledonia), *S. simplex* (Brazil), *Tylimanthus bisetulus* (New Caledonia), *T. congoanus* (West Africa), *T. giganteus* (Philippine Islands), *T. heterophyllus* (Georgia), *T. homomallus* (Antipodes Islands), *T. japonicus* (Japan), *T. indicus* (India), *T. maximus* (New Guinea), *T. Merrilanus* (Philippine Islands), *T. multidentatus* (New Caledonia), *T. paucidentatus* (Japan), *T. Pittieri* (Costa Rica), *T. retusus* (Cameroons), *T. setaceo-ciliatus* (Ecuador), *T. spinosus* (New Caledonia), *T. subtilis* (Surinam), *T. Wilmsii* (South Africa), *Zoopsis caledonica* (New Caledonia), and *Z. exigua* (New Guinea). Of these species *Isotachis trifida*, *Lophocolea rupicola* and *Plagiochila cucullifolia* are homonyms, there being an earlier *I. trifida* (Gottsche) Spruce from Colombia, an earlier *L. rupicola* Steph. from Tasmania, and an earlier *P. cucullifolia* Jack & Steph. from Colombia. The species described in the present instalment add materially to those included by the author in the earlier volumes of his work. For the genera treated the species now recognized total as follows: *Arachniopsis*, 5; *Chandonanthus*, 12; *Chiloscyphus*, 175; *Gongylanthus*, 12; *Harpanthus*, 3; *Hepocladium*, 5; *Isotachis*, 69; *Jackiella*, 5; *Leioscyphus*, 53; *Lepicolea*, 13; *Lepidozia*, 297; *Lophocolea*, 378; *Plagiochila*, 1171; *Schisma*, 86; *Tylimanthus*, 54; and *Zoopsis*, 11. [See also Bot. Absts. 13, Entry 7803, and preceding entry.]—A. W. Evans.

508. THÉRIOT, I. Musci novi africani. [New African mosses.] Bull. Mus. Hist. Nat. [Paris] 30: 239–246. 1924.—The new species here proposed came from various parts of Africa and are as follows, Thériot being the authority except where otherwise noted: *Anomobryum longisetum* (British East Africa), *Brachymenium kikuyuense* Broth. & Thér. (British East Africa), *Bryum deserticola* Broth. & Thér. (Sahara), *Campylopus calochlorus* Broth. & Thér. (British East Africa), *Cryphaea robusta* Broth. & Thér. (British East Africa), *Erythrodontium lamoruense* (British East Africa), *Funaria Dieterleni* (Basutoland), *Grimmia afro-ovata* Broth. & Thér. (Kenia), *Mielichhoferia Harioti* (Ruwenzori), *Neckera Gromieri* (British East Africa), *Plagiothecium Alluaudi* (Ruwenzori), *Rhaphidostegium Serandi* (French Guinea), *Rhynchostegium gracilipes* (Ruwenzori), *Webera Gromieri* (British East Africa), and *Weisia Dieterleni* (Basutoland). Each of the new species is accompanied by critical notes.—A. W. Evans.

509. THÉRIOT, I. Une colonie de mousses sur un toit. [A colony of mosses on a roof.] Bull. Soc. Linn. Seine Maritime 1923: 221–224. 3 fig. 1923.—The colony of mosses here reported grew on the roof of a hangar at Havre, France, and was brought to the attention of the author by P. Senay. It includes the following species, all acrocarpous: *Barbula convoluta* Hedw., *Bryum argenteum* L., *B. bicolor* Dicks., *B. intermedium* (Ludw.) Brid., and *Ceratodon purpureus* L. *Barbula convoluta* and *Bryum bicolor* show distinct xerophytic modifications in their leaves, but the other species do not. With the exception of *Bryum argenteum* all are sterile.—A. W. Evans.

510. THÉRIOT, I. Une curieuse méprise à propos de *Taxithelium decolor* (Besch.) R. C. [A strange misunderstanding regarding *Taxithelium decolor*.] Bull. Mus. Hist. Nat. [Paris] 29: 620–621. 8 fig. 1923.—The author publishes detailed figures of *Taxithelium decolor* of the Seychelles Islands, based on the type specimen collected in 1875 by G. de l'Isle. He

shows that the supposed figures of this species, published by Renaud in his *Atlas des Mousses de Madagascar*, were drawn from material of *Ectopothecium seychellarum* Besch.—A. W. Evans.

511. WHELDON, J. A. New forms of *Sphagnum*. British Bryological Soc. Rept. 1: 55-56. 1924.—One new variety and 7 new forms (or subforms) are described. The new variety, *S. Wardellense* var. *Salesianorum* Wheld. & Rhodes, is based on Patagonian material collected by Tonelli and Benove; the new forms, included under *S. aquatile*, *S. compactum*, *S. crassicladium*, *S. cymbifolium*, *S. imbricatum* and *S. subsecundum*, are based on material from the British Isles and Italy.—A. W. Evans.

512. WILLIAMS, R. S. Galapagos and Cocos Island mosses collected by Alban Stewart in 1905-6. Bryologist 27: 37-45. Pl. 5-8. 1924.—The author lists 16 species of mosses from the Galapagos Islands and 12 from Cocos Island, *Octoblepharum albidum* (L.) Hedw. being the only species recorded from both. Full data regarding stations and a few critical notes are included. The following are proposed as new and figured, the 1st from Charles Island in the Galapagos group and the other 3 from Cocos Island: *Daltonia Stewartii*, *Hookeriopsis cocoensis*, *Lepidopilum crassisetum* and *Pilotrichum obtusatum*. A 4th species from Cocos Island, *Syrrophodon Bernoullii* C. M., is likewise figured. At the close the author gives a short summary of the previous work on Galapagos mosses and brings out the fact that 24 species are now known from the archipelago, 5 or 6 of which are apparently endemic. Of the 12 species known from Cocos Island the 3 new species noted above seem to be endemic.—E. B. Chamberlain.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 123, 125, 126, 137, 188, 284, 670, 694, 743, 748, 749, 853, 855, 861, 877, 1005)

FUNGI

513. AJREKAR, S. L., AND B. R. TONAPY. A note on the life history of *Uromyces alôes* (Cke.) P. Magn. Jour. Indian Bot. Soc. 3: 267-269. 1 pl., 1 fig. 1923.—A species of *Uromyces*, identified as *U. alôes*, was found on *Aloe vera* near Poona, India. The life history includes only the teleutospore and spermatium. The teleutospore develops a promycelium of 2 (or 3) cells, the terminal cell becoming detached and functioning directly as a sporidium. Infections occur only during the rainy and cold seasons.—Winfield Dudgeon.

514. BAYLISS-ELLIOTT, J. S., AND OLIVE P. STANSFIELD. The life history of *Polythrincium trifolii* Kunze. Trans. British Mycol. Soc. 9: 218-228. Pl. 13. 1924.—The various stages in the life history of *Polythrincium trifolii* are described in detail. The perfect stage is found to be a *Dothidella* and not a *Phyllachora* as has been thought by various authors.—W. B. McDougall.

515. BELL, H. P. Fern rusts of *Abies*. Bot. Gaz. 77: 1-31. Pl. 1-4, fig. 1-10. 1924.—The urediniospores of *Uredinopsis*, in disagreement with previous reports, were found to be produced in chains. These spores do not show constant markings. The teliospores of *U. Osmundae*, *U. mirabilis* and *U. Phegopteridis* were observed to occur in a more or less regular layer immediately under the epidermis and not irregularly scattered as commonly stated. Field evidence indicated a possible relationship between *Peridermium pycnogrante* n. sp. on balsam and *U. polypodophile* n. sp. on the common polypody. Further, balsams affected with *P. pycnoconspicuum* n. sp. were found constantly associated with the oak fern bearing the uredinal stage of *Hyalopsora Aspidiotus*.—B. W. Wells.

516. BONAR, LEE. Studies on the biology of *Brachysporium trifolii*. Amer. Jour. Bot. 11: 123-158. 2 pl., 2 fig. 1924.—This paper presents a study of the physiological reactions and life history of this species, both in culture and on its natural host, the white clover. On

certain culture media, especially heavy oatmeal agar, small black bodies appear, growing upward through the mass of aerial mycelium in the form of black columnar stalks which often branch irregularly. These bodies are at 1st compact and homogeneous, but later a definite interior area is differentiated, which ultimately disintegrates. They seem to be immature perithecia, or, in part at least, homologous with perithecia. The effect of temperature, light, oxygen, humidity, acidity and alkalinity, and of the quantity and quality of food upon the growth of the mycelium, conidia and stalked bodies is described. This species has a wider range of conditions suitable for vegetative growth than for asexual reproduction; and for the latter than for production of the stalked bodies. A distinct albino mutation was found in a long cultivated pure line of the normal dark-colored form. Long-continued growth of the fungus in culture causes an attenuation of its virulence. Different species of *Trifolium* show varying degrees of susceptibility to attack by this fungus under the conditions of the inoculation chamber.—E. W. Sinnott.

517. BRITON-JONES, H. R. Strains of *Rhizoctonia Solani* Kühn (*Corticium vagum* Berk. and Curt.). Trans. British Mycol. Soc. 9: 200-210. 1924.—Seven strains of *Rhizoctonia Solani*, 4 of them from England, 1 from Egypt, 1 from India, and 1 from the U. S. A. were grown on various kinds of media under controlled environmental conditions. It was found that there are certain macroscopic differences which persist, but that no differences could be detected in microscopic characters. A number of experiments were also carried on to determine the relative pathogenicity of the different strains on the same host. It was found that 3 strains were less active as parasites than the other 4, probably because 1 was of slower growth. The author believes that the differences found are not enough to warrant making separate species and therefore retains all the strains that he worked with under the 1 name, at the same time recognizing that several biological species are represented.—W. B. McDougall.

518. BROOKS, F. T. Two books on fungi. [Rev. of: (1) RAMSBOTTOM, JOHN. A handbook of the larger British fungi. iv + 222 p., 141 fig. British Museum. Taylor & Francis: London, 1923 (see Bot. Absts. 13, Entry 5973). (2) NOWELL, WILLIAM. Diseases of crop-plants in the Lesser Antilles. xix + 383 p. Imp. Dept. Agric., West India Committee: London, 1923 (see Bot. Absts. 13, Entry 5328).] New Phytol. 23: 63-64. 1924. (See also Bot. Absts. 13, Entry 4405.)

519. CUNNINGHAM, G. H. The development of *Gallacea scleroderma* (Cke.) Lloyd. Trans. British Mycol. Soc. 9: 193-200. Pl. 9-10. 1924.—*Gallacea* is a monotypic genus of *Gastromycetes* confined to New Zealand. The mature plant and its developmental stages are described in detail. It is tentatively placed in the family *Hysterangiaceae* although in a later paper it is intended to place this genus along with several others in a distinct family.—W. B. McDougall.

520. DEARNESS, JOHN. New and noteworthy fungi. III. Mycologia 16: 143-176. 1924.—The following fungi from various parts of North America are described as new; unless otherwise noted, the authority is Dearness: *Peronospora Lophanthi* Farl. var. *Moldavicae* Dearn. & Barth.; *Phacidium Gaultheriae*; *Mollisia Angelicae*; *Hypoderma robustum* Tubeuf f. *latispora* and var. *Pini*; *Hypoderma deformans* Weir f. *contorta*; *Hypodermella medusa*; *Dimerosporium Tsugae*; *Microthyrium Thuyae*; *Dothidella Castanopsidis*; *Rhopographus nucleatus*; *Teichospora mammosides* E. & E. var. *Opuntiae* Dearn. & Barth.; *Lophiostoma Elymi*; *Mycosphaerella chenopodii* Dearn. & Barth.; *Anthostomella longispora* Dearn. & Barth.; *Diaporthe binoculata* Ell. var. *Clethrae*, *Phyllosticta Gaultheriae* E. & E. f. *shallon*; *Phyllosticta cruenta* (Fr.) Kickx var. *longispora*; *Phoma Akebiae*; *P. Cynoglossi*; *P. 'spermoides*; *Macrophoma Oenotherae-biennis*; *Dendrophoma Syringae*; *Sphaeropsis Akebiae*, *S. baccharidicola*, *S. Amelanchieris*, *S. Prosopidis* Dearn. & Barth.; *S. Tecomae*, *Coniothyrium Bartholomaei* Dearn. & Barth. (?); *Haplosporella rhoina* Dearn. & Barth.; *Botryodiplodia compressa* (Cke) Sacc. f. *Toxicodendri*; *Kellermania major* Dearn. & Barth. *Hendersonia Grantii*; *Camarosporium astericolum* Ell. & Barth. var. *latispora*; *Dichomera Clethrae*; *Septoria asclepiadicola* E. & E. f. *syriaca*; *Septoria Radiculae*, *Leptothyrium chenopodii* Dearn. & Barth.; *L. Lactucae* Dearn. & Barth.; *L. Smilacis*; *Piggotia depressa*; *Leptothyrella Lathamii*; *L. Robiniae* Dearn. & Barth.; *Leptostromella Panici*; *Phragmopeltis Phragmitis*; *Gloeosporium Betulae-papyriferae* Dearn.

& Overh.; *G. Chamaedaphnis*; *G. hysteroideum*, *G. Lathamii*, *G. Osmaroniae*, *Myxosporium alboluteum* Dearn. & Barth.; *M. Oenetherae*, *M. Tiliae*, *M. Stellatum*; *Septogloeum Celtidis*; *Rhopalidium cercosporelloides*; *Scolecosporium pedicellatum* Dearn. & Overh.; *Coryneum cinereum*; *C. thujinum*; *Hyaloceras Hamamelidis*; *Cylindrosporium brevispina*, *C. consociatum*, *C. Urticae*; *Coniosporium subcorticale* Dearn. & Barth.; *Trichosporium Falcatae* Dearn. & Barth.; *T. pinicolum* Dearn. & Barth. (?); *Cladosporium Salicis-sitchensis* Dearn. & Barth.; *Helmintosporium stromatoideum*, *Stigmella Nemopanthis*, *Cercospora Ichthyomethiae* Dearn. & Barth.; *Dendrostilbe Ulmi*, *Atractilina* Dearn. & Barth., n. gen., *A. Callicarpae* Dearn. & Barth.; and *Tuberculina flavogranulata* Dearn. & Barth. A few new combinations are made, and notes are given on various other fungi, especially the Hyperodermataceae.—*G. R. Bisby.*

521. DEMETER, KARL. Über "Plasmoptysen"—Mykorrhiza. [Plasmoptysic-mycorrhiza.] *Flora* 116: 405-456. Pl. 7, 5 fig. 1923.—The fungus which forms mycorrhiza on the roots of *Vinca minor*, *Vincetoxicum officinale* and *Asclepias cornuti* seems to be the same as that found on roots of orchids, ascribed to the genus *Rhizoctonia* (*R. apocyanacearum*). *Vinca minor* is an obligate mycotrophe with about $\frac{1}{3}$ of its roots free from fungus. No uninfected plants were found in nature, but in cultures uninfected plants grew more luxuriantly than infected plants. The fungus is a starch specialist, found only in the vicinity of its host. The fungus penetrates to the cortex through short specialized exodermal cells which alternate with long suberized cells; it spreads throughout the cortex developing both intra- and intercellular mycelium. After entrance of the fungus the starch disappears from the cortical cells. Tannin cells are not attacked but the contents undergo change. Infection may occur throughout the year but is greatest from March to May. Terminal and intercalary vesicles may form on both types of hyphae; these seem to be storage organs. More important than the vesicles in the life of both host and fungus are the intracellular tree-like structures to which Gallaud gave the name "arbuscules." A cloud of fine granules envelops the short tips of the branches. These granules are apparently a protein precipitate formed by the mixing of the protoplasm of host and fungus when the tips of the branches burst open. Experiments with hydrochloric acid suggest that the bursting of the hyphae may be due to a concentration of acid in the host cells. Later the granules diffuse throughout the cell. Finally, they unite to form several unorganized bodies, the so-called sporangioles, within which it is impossible to tell whether host or fungus protein is involved. The name "Plasmoptysic-mycorrhiza," which was 1st used by A. Fischer for certain involution forms of the cholera vibrio, is suggested as an appropriate name for this type of endotrophic mycorrhiza.—*A. G. Stokey.*

522. FAULL, J. H., AND G. D. DARKER. The aecial stage of *Hyalopsora aspidiotus* (Peck) P. Magnus. (Abstract) *Phytopathology* 14: 350. 1924.—*Hyalopsora aspidiotus* (Peck) P. Magnus and *Peridermium pycnoconspicuum* Bell. were found to be stages of the same rust.—*Adeline Ames.*

523. GAUMANN, E. Les espèces de *Peronospora* sur les Euphorbiacées et les Polygonacées. [The species of *Peronospora* on Euphorbiaceae and Polygonaceae.] *Ann. Conservatoire et Jard. Bot. Genève* 21: 1-23. Fig. 1-7. 1919.—In addition to a discussion of all the species found on plants of the 2 families mentioned, the following new species are described: *P. valesiaca*, on leaves of *Euphorbia Gerardiana* Jacq., Valais, Switzerland; *P. Euphorbiae glyptospermae*, on leaves of *Euphorbia glyptosperma*, Nebraska, U. S. A.; *P. Esulae*, on leaves of *E. Esula* L., Moravia, Brandenburg, Silesia; *P. Americana*, on leaves of *Polygonum ramosissimum* Michx., Nebraska.—*A. S. Hitchcock.*

524. HAWLEY, H. C. Flora of a blackbird's nest in August. *Trans. British Mycol. Soc.* 9: 239-240. 1924.—A list is given of 14 species of fungi found in a fruiting condition on the material composing a blackbird's nest, in August 1923.—*W. B. McDougall.*

525. KASAI, M. Cultural studies with *Gibberella Saubinetii* (Mont.) Sacc. which is parasitic on rice-plant. *Ber. Ohara Inst. Landw. Forsch.* 2: 259-272. 1923.—Observations made upon infected rice plants from the field indicate that *G. Saubinetii* is the perfect stage of the *Fusarium* species which has been known as the cause of seedling blight, head blight,

and stem rot of the rice plant. The author succeeded in establishing the identity of the 2 fungi by the use of pure cultures. The conidial stage is regarded as *F. graminearum* Schwarbe. Notes on the pigment produced by the fungus are appended.—*H. S. Reed.*

526. KEISSLER, C. Schedae ad "Kryptogamas exsiccatas" editae a Museo historiae naturalis Vindobonensi. [Labels for the cryptogamic exsiccatae edited by the Natural History Museum in Vienna.] Ann. Naturhist. Mus. Wien 37: 201-214. 1924.—The labels are given for Century 28 of this series, being a continuation, as follows: Nos. 2701-2740 (decades 104-107) Fungi; nos. 2741-2780 (decades 63-71) Lichens; nos. 2781-2800 (decades 63, 64) Musci. There are addenda for each group.—*A. S. Hitchcock.*

527. KEISSLER, KARL. Fungi novi sinenses a Dre. H. Handel-Mazzetti lecti. III. Oesterreich. Bot. Zeitschr. 73: 123-128. 1924.—The following are described as new: *Uncinula Ehretiae*, *Lachnum foliicola*, *Elaeodema floricola*, *Monostichella Tetrastigmatis*, *Cylindrosporium Leucocephali*, *Coniosporium Spondiadis*, *Lophodermium Pieridis*, *Pseudohelotium quercinum*, *Phialea Myricariae*, *Leptothyrium Glycosmidis*, *Heydenia Myrsynes*, and *Sphaerulina intermixta* Sacc. f. *Jasmini*, n. f.—*Ernst Artschwager.*

528. KEISSLER, K[ARL]. Tilachliidiopsis nov. gen. Phaeostilbeae-Amerosporae. Eine neue Pitzgattung. [Tilachliidiopsis. A new genus of fungi.] Ann. Naturhist. Mus. Wien 37: 215-216. Fig. 1. 1924.—The genus and 1 species, *T. racemosa*, are described as new, the latter from Mt. Sagberg near Tullnerbach, Austria, on decayed pine needles. *T. hippotrichoides* (Lind.) Keissl., based on *Clavularia hippotrichoides* Lind. is also included.—*A. S. Hitchcock.*

529. KRIEGER, LOUIS C. C. Preliminary note on the position of the hymenium in *Physalacria inflata* (Schw.) Peck. Maryland Acad. Sci. Bull. 3: 7-8. 1923.—This fungus is transferred from the Clavariaceae to the Agaricaceae near *Gloiocephala* and *Eomycenella*. The name is changed to *Boagaricus inflatus* (Schw.) n. comb. The reasons for the transfer are briefly stated and a later, illustrated paper is promised.—*H. M. Fitzpatrick.*

530. LIESKE, R. [Rev. of: LIESKE, R. Morphologie und Biologie der Strahlenpilze (Actinomyceten). (Morphology and biology of the actinomycetes.) ix + 292 p. 4 pl. (colored), 112 fig. Gebrüder Bornträger: Berlin, 1921 (see Bot. Absts. 11, Entry 2718).] Arch. Protistenk. 44: 261-264. 1922.

531. MARTIN-SANS, L. Forme anormale de *Stropharia aeruginosa* Curt. Bull. Trimest. Soc. Mycol. France 39: 275. 1924.

532. MOESZ, G. VON. Hazslinszky némely rozsdagombájának megfejtése.—Berichtigung der Bestimmungen einiger Rostpilze von Fr. Hazslinszky. (Text in Hungarian and German.) [Corrections in the determinations of some rust fungi described by Fr. Hazslinszky.] Magyar Bot. Lapok 19: 10-15. 1920.—As a result of the author's critical study some of Hazslinszky's species are connected up as follows: *Aecidium amphigenum* Hzs. = *Puccinia podospermi* DC.; *A. gregarium* Hzs. = *Puccinia tragopogi* (Pers) Cda; *A. Salviae* Hzs. = *Puccinia phlomidis* Thuemen; *Puccinia cornuta* Hzs. = *P. Salviae* Unger; *P. Fagopyri* Hzs. = *P. convolvuli* (Pers.) Cast. and *Uredo Origani* Hzs. = *Puccinia menthiae* Pers.—The status of *Aecidium trifolii* Hzs., *A. Nasturtii* Hzs. and *Uromyces Linariae* Hzs. could not be determined because of lack of original specimens in the herbarium of the Hungarian National Museum.—*Frederick V. Rand.*

533. MORIN, R. Note sur le *Pleurotus Eryngii* rencontré sur le littoral de la Seine-Inférieure. Bull. Trimest. Soc. Mycol. France 39: 221. 1924.

534. PASCHER, A. [Rev. of: KEYLIN, D. On a new saccharomycete—*Monosporella unicuspidata*—parasitic in the body of a dipterous larva (*Dasyhela obscura* Winnertz). Parasitology 12: 83-91. 1920.] Arch. Protistenk. 45: 152. 1922.

535. PECK, A. E. Yorkshire mycologists at Masham. Naturalist 1923: 405-407. 1923.—The report contains a list of the more interesting fungi seen, including myxomycetes. Eleven species are new to the county flora.—*W. H. Burrell.*

536. PETCH, T. *Monotospora oryzae* B. & Br. Jour. Indian Bot. Soc. 4: 21-24. 2 fig. 1924.—Examination of the type specimen shows that *Monotospora oryzae* was described from a mixture of species. A fungus on diseased rice (in Ceylon) shows spore characters resembling *M. oryzae*, but agreement is imperfect. It is, however, "identical" with the

Javan *Nigrospora panici* Zimm. except for spore size, and the author concludes that "Berkley and Broome's species must stand as *Nigrospora oryzae* (B. & Br.) n. comb."—Winfield Dudgeon.

537. POIX, G. Note sur la présence d'*Amanita Caesarea* dans les Vosges. Bull. Trimest. Soc. Mycol. France 39: 276. 1924.

538. RYAN, RUTH W. The Microthyriaceae of Porto Rico. Mycologia 16: 177-196. 1924. The following are described as new: *Seynesia coccolobae*, *S. cordiae*; *Microthyrium calophylli*; *Caudella psidii*; *Calothyrium psychotriae*, *C. hippocrateae*, *C. ingae*; *Asterina genipae*, *A. drypetis*, *A. fawcettii*, *A. sidicola*, *A. hippocrateae*, *A. miconiae*, *A. ixonae*, *A. racemosae*, *A. miconicola*, *A. guianensis*, *A. tetrazygiae*, *A. passifloricola*, *A. arnaudia*, *A. sydowniana*, *A. psidii*, *A. portoricensis*, *A. psychotriae*, *A. myrciae*, *A. melastomacearum*, *A. theissenia*, *A. versipoda*; *Asterinella hippeastri*, *A. ixonae*, *A. phoradendri*, *A. melastomacearum*; *Aulographum cestri*; *Lembosia portoricensis*, *L. rapunae*, *L. sapotae*; *Morenoella miconiae*, *M. miconicola*, *M. langeriae*, *M. cestri*, *M. giganteae*, *M. melastomacearum*, *M. psychotriae*; *Echidnodes bromeliae*, *E. mammeae*; *Echidnodella miconiae*, *E. myrciae*, *E. fourcroyae*, *E. rondeletiae*, *E. melastomacearum*. Several new varieties are also described, other species are recorded, and a key to the genera is given.—G. R. Bisby.

539. TEHON, L. R. Notes on the parasitic fungi of Illinois. Mycologia 16: 135-142. Pl. 13. 1924.—The following species are described as new: *Septoria atropurpurei* on *Euonymus atropurpureus*; *Leptothyrium brunnichiae* on *Brunnichia cirrheae*; *Actinothyrium gloeosporioides* on *Sassafras variifolium*; *Pirostoma nyssae* on *Nyssa sulcata*; *Cercospora plantaginella* on *Plantago rugelii*; *C. hemerocallis* on *Hemerocallis fulva*; *C. psedericola* on *Psedera quinquefolia*; *C. nepetae* on *Nepeta cataria*; *C. viminei* on *Aster vimineus*; *Colletotrichum trillii* on *Trillium recurvatum*. *Cercospora cercidicola* Ell var. *coremioides* is given as a new variety on *Cercis canadensis*. Several fungi are also included as new to Illinois. Most of the collections were made in the southern part of the state.—G. R. Bisby.

540. WILSON, MALCOLM. A new species of *Monochaetia*. Trans. British Mycol. Soc. 9: 189-192. Pl. 8. 1924.—A fungus found on dead leaves of *Cryptomeria japonica* is described in detail and named *Monochaetia Cryptomeriae*.—W. B. McDougall.

541. ZANGHERI, P. Flora di Romagna, Funghi (Hymeniales). [Hymeniales of Romagna.] Nuovo Gior. Bot. Ital. N. S. 31: 71-104. 1924.—After a short introduction describing the territory and reviewing the work of other collectors in this part of Italy, the author lists 327 species and 5 varieties of *Hymeniales*. In each case the host, time of collection, and edibility are given.—P. D. Caldis.

BACTERIA

542. ANONYMOUS. [Rev. of: CONN, H. W., AND H. J. CONN. Bacteriology: a study of micro-organisms and their relation to human welfare. 441 p. Williams & Wilkins Co.: Baltimore, 1923.] Nature 113: 853. 1924.

543. BIDAULT, C. Sur la culture de *B. botulinus* en conserves de viande. [The culture of *B. botulinus* on canned meat.] Compt. Rend. Soc. Biol. 90: 1002-1003. 1924.—A method is described in which the can is sealed with a drop of solder immediately after inoculation.—Oran Raber.

544. HELLER, HILDA HEMPL. Suggestions concerning a rational basis for the classification of anaerobic bacteria.—Studies in pathogenic anaerobes. IV. Preliminary paper. Jour. Bact. 6: 521-553. 1921.—A general classification of anaerobic spore-bearing rods is proposed. It is suggested that generic characters may be based on quantitative biochemical behavior in ordinary media. Anaerobic species, as now considered, should be raised to generic rank.—C. E. Skinner.

545. HELLER, HILDA HEMPL. Certain genera of the Clostridiaceae. Studies in pathogenic anaerobes. V. Jour. Bact. 7: 1-36. 1922.—The following new genera of anaerobic rods are described, all of which are raised from specific rank: *Omeliaskillus*, *Macintoshillus*, *Douglasillus*, *Henrillus*, *Flemingillus*, *Vallorillus*, *Multifermentans*, *Hiblerillus*, *Welchillus*, *Stoddardillus*, *Rivoltillus*, *Arloingillus*, *Meyerillus*, *Novillus*, *Seguinillus*, *Reglillus*, *Robertsonillus*, *Nicolaierillus*, *Martellillus*, *Recordillus*, *Tissierillus*, *Putrificus*, *Ermengemillus*, *Metchnikovillus*, *Weinbergillus*.—C. E. Skinner.

546. HENRICI, ARTHUR T. A statistical study of the form and growth of *Bacterium coli*. Proc. Soc. Exp. Biol. and Med. 21: 215-217. 1924.—Photomicrographs were projected and traced on paper. Cells were found to vary from spherical to cylindrical types, the area-length index being higher for the spherical forms. It was found that the cells show a marked increase in length followed by a rapid decrease to the original size during the logarithmic growth phase, and then show minor fluctuations. There seems to be a negative correlation between the length of the cells and the area-length index.—*M. M. Brooks*.

547. HENRICI, ARTHUR T. Influence of age of parent culture on size of cells of *Bacillus megatherium*. Proc. Soc. Exp. Biol. and Med. 21: 343-345. 1924.—The greatest decrease in size occurred between the 5th and 6th hours, as was also the case with the parent culture.—*M. M. Brooks*.

548. HENRICI, ARTHUR T. Influence of concentration of nutrients on size of cells of *Bacillus megatherium*. Proc. Soc. Exp. Biol. and Med. 21: 345-346. 1924.—Reducing the concentration of nutrients has the same effect on the size-curve as increasing the concentration of bacterial substance; the form of the curve is therefore determined by the proportion between these 2 factors.—*M. M. Brooks*.

549. HIRSZFELD, E., ET J. ZAJDEL. Sur la variabilité des Bactéries sous l'influence des conditions thermiques défavorables. [Variability of bacteria under unfavorable temperature conditions.] Compt. Rend. Soc. Biol. 90: 1104-1105. 1924.—Form H of *Proteus* X19 when cultivated at 42° behaves morphologically and serologically like form 0, and at 37° returns to the form H except that some individuals remain as form 0.—Forms of the typhoid bacillus not ordinarily agglutinated can be agglutinated if cultivated at 42°. Hence suspected forms which are not agglutinated should be tried at 42°.—*Oran Raber*.

550. MACY, HAROLD. Chart of the families and genera of bacteria. Jour. Bact. 6: 575-576. 1921.

551. PONS, R. Microbe spiralé aérobic, saprophyte de la cavité buccale de l'Homme. [A spiral aerobic microbe saprophytic in the buccal cavity of man.] Compt. Rend. Soc. Biol. 91: 150-151. 1924.—Cultural characters are given and emphasis is placed upon the fact that this is the 1st spiral organism isolated from the mouth which has been grown in pure cultures in a strictly aerobic condition.—*Oran Raber*.

552. SNOW, LAETITIA M. Bacteria in arid soils. Carnegie Inst. Washington Year Book 22: 65. 1924.—The beginning of a study of the bacterial and fungous flora of a light sand at Tucson, Arizona, is reported.—*B. E. Livingston*.

553. TRUCHE, C., ET L. COTONI. Germe d'aspect pneumococcique liquéfiant la gélatine, rencontré chez des Oiseaux. [A pneumococcus-like germ which liquifies gelatin and is found in birds.] Compt. Rend. Soc. Biol. 91: 52-54. 1924.—An organism found in the blood of canaries is described. Its characters are given and its relation to *Bacterium concentricum* Kern is discussed.—*Oran Raber*.

554. YOKOTA, KIYOSHI. Méthode de coloration des cils. [A method of staining flagella.] Compt. Rend. Soc. Biol. 90: 1303-1304. 1924.—The cultures are fixed by the addition of 0.5% formol. As a mordant, 5% tannic acid is added, and then 30 parts of aniline water to 1 of concentrated fuchsin solution is used as a stain.—*Oran Raber*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 92, 106)

555. BERRY, EDWARD WILBER. The Middle and Upper Eocene floras of southeastern North America. U. S. Geol. Survey Prof. Paper 92. 1-206. 65 pl. 1924.—This is a monographic treatment of the middle and upper Eocene and is a continuation of Professional Paper 91 published in 1916. Together the whole Eocene is covered. The stratigraphic succession, and the composition and ecologic conditions are fully discussed. These floras are largely composed of immigrants into southeastern North America from the American tropics, and indicate a northward swing of sub-tropical conditions. The middle Eocene or Claiborne flora

consists of 90 species and that of the upper Eocene or Jackson comprises 133 species. Following are the new species described: *Pteris inquirenda*, *Canna flaccidifolia*, *Bactrites pandaniifolius*, *Geonomites claibornensis*, *Hicoria jacksoniana*, *Myrica claiborniana*, *Dryophyllum brevipetiolatum*, *Ficus unionensis*, *F. newtonensis*, *Aristolochia claiborniana*, *Coccolobis claiborniana*, *C. columbianus*, *Inga arkansensis*, *Cassia cockfieldensis*, *Sophora claiborniana*, *S. balli*, *Fagara claibornensis*, *F. petraflumensis*, *Citrophylllum eocenicum*, *Cedrela jacksoniana*, *Celastrophylllum gymindoides*, *C. columbianum*, *Euonymus santotomasensis*, *Cupanites parvulus*, *Sapindus yeguanus*, *Zizyphus claibornensis*, *Grewiopsis claiborniana*, *Sterculia labruscoides*, *Ternstroemites crowleyensis*, *T. claibornensis*, *Cinnamomum angustum*, *Persea gratissimifolia*, *P. lexingtonensis*, *Oreodaphne inaequilateralis*, *Mespilodaphne columbiana*, *M. caudata*, *Nectandra gosportensis*, *Laurinoxylon bakeri*, *Combretum petraflumensis*, *Terminalia claibornensis*, *Laguncularia claiborniana*, *Myrcia trowbridgi*, *Oreopanax mississippiensis*, *Nyssa texana*, *Mimusops claibornensis*, *Apocynophyllum texensis*, *A. grevilleaefolium*, *Caenomyces jacksonensis*, *Canna jacksoniana*, *Smilax fayettensis*, *Palmocarpon sessile*, *Engelhardtia jacksonensis*, *Hicoria rostrataformis*, *Planera hickmanensis*, *Ficus brazosensis*, *Banksia jacksonensis*, *Pisonia jacksoniana*, *P. balli*, *Menispermities carolinaformis*, *Capparidocarpus sphericus*, *Inga jacksoniana*, *Mimosites spatulatus*, *M. mississippiensis*, *Cassia jacksoniana*, *C. georgiana*, *C. obionana*, *Bauhinia wadii*, *Papilionites erythrinaformis*, *Lonchocarpus anceps*, *Liquidambar incerta*, *Banisteria texana*, *Burserites fayettensis*, *Anacardites balli*, *Rhamnites krugiodendroides*, *Ceanothus jacksonensis*, *Grewiopsis wadii*, *Tilia jacksoniana*, *Bombacites jacksonensis*, *Dombeyoxylon jacksonensis*, *Buettneria jacksoniana*, *Ternstroemites variabilis*, *Mespilodaphne texana*, *M. jacksonensis*, *Oreodaphne brazosensis*, *Nectandra antillanaefolia*, *Myrcia ambiguaformis*, *Nyssa jacksoniana*, *Calocarpum viridiforme*, *Sapotacites miraflorianus*, *S. millicanensis*, *Chrysophyllum preoliviforme*, *Bumelia balli*, *Diospyros miraflorianus*, *Citharexylon brazosense*, *Carpolithus callitriformis*, *C. najasoides*, *C. balli*, *Cypselites jacksonensis*, and *Antholithes balli*.—E. W. Berry.

556. POTONIÉ, ROBT. Die Culmflora von Merzdorf am Bober. [The Culmflora of Merzdorf.] Jahrb. Preuss. Geol. Landes. 43: 411-425. Fig. 2. 1923.—The author describes the following species from the Lower Carboniferous of Merzdorf in Silesia: *Archaeopteris Zimmermanni* n. sp., *Sphenopteridium Schimper* (Goeppert) Schimper, *Cardiopteris frondosa* (Goeppert) Schimper, *Rhodesia* cf. *Stachei* Stur., *Sphenopteris* sp., *Asterocalamites scrobiculatus* (Schlot.) Zeiller, *Lepidodendron acuminatum* (Goeppert) Unger, and *Stigmaria ficoides* Brongn.—E. W. Berry.

557. WALTON, J. On the structure of a middle Cambrian alga from British Columbia (Marpolia Spissa Walcott). Proc. Cambridge Phil. Soc. Biol. Sci. 1: 59-62. Pl. 5., fig. 1. 1923.

558. WHITE, DAVID. The prehistoric forests of Pennsylvania. Forest Leaves 19: 169-175. 1924.—This is a popular account of the history of vegetation on the earth during geologic time, especially as displayed in the rocks of Pennsylvania and corresponding horizons in adjacent regions, illustrated by good diagrams of the geologic time table and the evolving plant types.—E. W. Berry.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH and HARRY BRAUN, *Assistant Editors*

(See also in this issue Entries 15, 181, 188, 213, 232, 233, 236, 268, 279, 307, 341, 405, 406, 426, 428, 451, 462, 463, 464, 513, 515, 516, 517, 521, 522, 523, 525, 532, 534, 536, 542, 554, 677, 686, 718, 747, 748, 749, 751, 765, 775, 776, 824, 832, 845, 853, 876, 882, 895, 896, 901, 902, 903, 908, 909, 910, 924, 928, 933)

DISEASES CAUSED BY FUNGI

559. ANONYMOUS. Red rot. South African Sugar Jour. 8: 395. 1924.—This is a popular discussion of symptoms and control measures for the red rot of sugar cane (organism not stated; possibly *Colletotrichum falcatum*).—Harry Braun.

560. ANDERSON, H. W. Apple blister canker. Amer. Fruit Grower 43²: 22-23, 41. *Illus.* 1923.—Apple blister canker, caused by *Nummularia discreta* Tul., which, in the Mississippi Valley, is primarily a disease of Ben Davis trees, is discussed in regard to its economic importance, nature, symptoms, life history, and mode of control.—Arthur S. Rhoads.

561. BERNARD, CH. Over enkele theeziekten. [Some tea diseases.] Thee 4: 16-20. 1923.—*Cercospora theae* of Java is believed to differ but little from *Cercospora theae* of Ceylon. It attacks *Acacia decurrens* and other *Acacia* species, sometimes causing defoliation. The leaf spots produced on tea may also destroy leaves, but the disease is not feared in Java, since it develops late in the rainy season and quickly disappears with the coming of the dry season. *Aglaospora aculeata*, a stem rotting fungus, is rare if present at all, in Java. *Poria hypolaterita* is the most dangerous root fungus in Java, where, as in Sumatra, it develops at all elevations and under all conditions, attacking *Hevea* as much as it does tea. Affected tea plants should be carefully grubbed out, the soil treated with slaked lime, and the focus isolated from the rest of the plantation by a ditch including all healthy bushes adjoining those affected. Petch is incorrect in making *Armillaria* attack in Java the result of the presence of *Armillaria* diseased roots in the ground, since the fungus was active before the *Acacia* was introduced. However, removal of old *Acacia* stumps is advisable when planting tea.—Carl Hartley.

562. BIRMINGHAM, W. A. A canker of apple trees. Due to a fungus, *Dothiorella mali*, E. & E. Agric. Gaz. New South Wales 35: 525-527. 3 fig. 1924.—No previous record is known of apple tree canker being produced by this fungus. Cultures were made and inoculations of healthy trees resulted in cankerous infections.—L. R. Waldron.

563. BIRMINGHAM, W. A. A fungus and some of its host plants. (*Sclerotium rolfsii*, Sacc.). Agric. Gaz. New South Wales 35: 441-444. 6 fig. 1924.—This fungus has been found attacking carnations and potatoes in N. S. W. Notes are given of its attacking other plants in other localities.—L. R. Waldron.

564. BRAID, K. W. Some observations on *Fistulina hepatica* and hollow, stag-headed oaks. Trans. British Mycol. Soc. 9: 210-213. 1924.—*Fistulina hepatica* was found on 60-75% of the oaks in a park in England. This fungus plays a large part in the hollowing of oaks and may also be an important factor in causing the condition known as stag-headedness.—W. B. McDougall.

565. BROOKS, F. T., AND W. C. MOORE. On the invasion of woody tissues by wound parasites. Proc. Cambridge Phil. Soc. Biol. Sci. 1: 56-58. Fig. 1. 1923.—The mode of infection of woody tissue of *Victoria plum* by *Stereum purpureum* is described. Spores of wound parasites which invade woody tissues are carried into the tissues before germination.—Michael Levine.

566. BURGER, O. F. Citrus stem end rot. Citrus Indust. 4^o: 14. 1923.—Decay in transit is regarded as a highly important factor which may mean the difference between profit and loss in citrus fruit marketing. Decay of citrus fruit in transit is brought about by certain organisms which can attack fruit only after the rind has been broken by various injuries. *Phomopsis citri* Fawcett, which causes both melanose and stem-end rot of citrus fruits, is regarded as the most destructive of these organisms. Directions for keeping this fungus under control in the groves by spraying are given. The stage of maturity of the fruit is said to determine the amount of infection by the stem-end rot fungus. Observations show that when the stem-end rot organism is present in groves, infection increases after the abscission layer between the button and the fruit is formed. Variations in the amount of stem-end rot of citrus fruit quoted in the market reports were found to be directly related to the time of ripening of the different varieties, the stage of maturity of those varieties when shipped and the weather conditions at the time of shipping. It is believed that if all trees are thoroughly pruned of dead wood, if a Bordeaux-oil emulsion spray is correctly applied to control melanose, and if the fruit is picked before the abscission layer is formed, stem-end rot in transit will be controlled.—Arthur S. Rhoads.

567. [BURGER] BERGER, O. F., AND WM. GOMME. Black rot of oranges. Citrus Indust. 4¹: 42. 1923.—This is a reprint of Press Bull. 343 of the Florida Agric. Exp. Sta. Black rot of oranges caused by *Alternaria citri*, is described in detail. This disease is said to vary greatly

in the amount of damage, considerable damage having been reported in Florida in 1911, but since then this disease caused no alarm until 1922. Black rot was formerly thought to attack only the navel orange but in 1911 it was found on pineapple and Ruby Blood, and in 1922 it has been reported as appearing on Ruby Blood, Parson Brown, Pineapple, Jaffa, Tangerine, and Valencia. One grove of Jaffa oranges visited in November, 1922, showed a drop of 25% of the fruit caused by black rot. The control measures recommended consist in picking up all infected oranges in the groves and burying them, seeing that none of the blackened oranges go into the wash water or remain on the floor in the packing house, prompt shipping in case the variety affected is mature, and spraying with 3-3-50 Bordeaux-oil emulsion in the case of the Valencia or other late oranges.—*Arthur S. Rhoads*.

568. BURGER, O. F., E. F. DEBUSK, AND W. R. BRIGGS. Controlling melanose. *Citrus Indust.* 4^o: 6-8. 1923.—Melanose, caused by *Phomopsis citri* Fawcett, is regarded as the most serious disease with which citrus growers have to contend. It is held responsible for a larger percentage of low-grade and unsightly fruit than any other one thing. Sixty per cent of the russeted fruit is said to be caused by melanose alone, the rest being the result of ammoniation, rust mite and scab. Grapefruit and seedling oranges are regarded as more affected by melanose than any other kind of citrus fruit. The symptoms of melanose and the way in which the fruit becomes affected are described in detail. Inoculation experiments show that the leaves become immune to melanose when 4-6 weeks old and that the fruit becomes immune about June 1. While a thorough removal of all dead wood will control melanose, it is impractical to prune out all the small twigs in a large grove, so that a combined pruning and spraying is regarded as necessary for the commercial control of this disease. A single application of 3-3-50 Bordeaux mixture with 1% of oil as an emulsion, shortly after petal fall, is regarded as sufficient spraying to supplement the pruning. Since the Bordeaux mixture likewise kills the beneficial fungi on which many growers rely to keep their scale insects and white fly in check, it is recommended that an application of straight oil emulsion be made about a month or 6 weeks later to check the increase of insect pests.—*Arthur S. Rhoads*.

569. CARNE, W. M., AND J. G. C. CAMPBELL. Rust of Cereals. *Jour. Dept. Agric. Western Australia* 2nd Ser. 1^o: 73-80. *Fig. 1-5*. 1924.—The life history of stem rust of wheat and barley (*Puccinia graminis* var. *tritici*) is described in detail. Owing to the absence of the barberry as a factor in the life cycle of the rust in Western Australia, it is pointed out that the method whereby infection is carried over from season to season has not been satisfactorily explained. Three suggested methods are repeated. By way of methods of control the growing of rust-escaping and rust-resistant varieties is recommended. Mention is made of the fact that attempts to produce resistant varieties have thus far been only partially successful, because varieties resistant in one locality have not always proved to be resistant elsewhere. The discovery by E. C. Stakman and his colleagues in Minnesota, U. S. A., of a number of different strains (biologic forms) of the rust, is given as the explanation of the difficulty attending the breeding of resistant strains. The rust to date is not a serious economic factor in Western Australia. Other rusts, namely, *Puccinia graminis* var. *avenae*, *P. lolii-avenae*, *P. triticea*, and *P. simplex* are briefly mentioned.—*P. J. Olson*.

570. CUNNINGHAM, G. H. *Fabraea*-scald, *Fabraea maculata* (Lev.) Atk. *New Zealand Jour. Agric.* 28: 96-102. *4 fig.* 1924.—In New Zealand *Fabraea maculata* is found only on pear and quince. Its appearance, the life history of the parasite, and control measures are discussed in detail.—*N. J. Giddings*.

571. CURTIS, K. M. Black-spot of apple and pear. *New Zealand Jour. Agric.* 28: 21-28. *3 fig.* 1924.—The ploughing under of apple leaves in experimental plots was found to reduce black spot [scab], infection very materially. Raking and burning the leaves was found to be still more effective, but was impractical because of the time and expense involved. Spraying the dead leaves on the ground about the time of ascospore discharge resulted in greatly reduced infection and it is believed that the method is practical.—*N. J. Giddings*.

572. DEBUSK, E. F. Decay due to methods of handling. *Citrus Indust.* 4^o: 9. 1923.—The prevention of decay in citrus fruit is discussed from the standpoints of picking equipment and the subsequent handling of the fruit in grove and packing house. Blue mold, which attacks citrus fruits only after the rind has been injured, is regarded as the cause of more loss to

the citrus industry than any other disease. Care in handling the fruit in all operations from picking to packing is regarded as of prime importance in the prevention of decay.—*Arthur S. Rhoads.*

573. FREEMAN, E. M., AND L. W. MELANDER. Simultaneous surveys for stem rust: a method of locating sources of inoculum. *Phytopathology* 14: 359-362. 1 fig. 1924.—It is suggested that the location of the last few bushes in a barberry eradication campaign can be accomplished by following the local epidemics of wheat rust. Simultaneous surveys before local epidemics become general should be made and the infected areas mapped to show the percentage of infection. Areas found consistently rusted should be searched for barberries. Other cereal and grass hosts may serve as indicators.—*Adeline Ames.*

574. HEMMI, TAKEWO. Nachträge zur Kenntnis der Gloeosporien. [Observations on *Gloeosporium*.] *Jour. Coll. Agric. Hokkaido Imp. Univ.* 9: 305-346. 1 pl. 1921.—Most of the author's work with anthracnoses from 1915-1920, has been published. The present paper deals with the physiology of Japanese *Gloeosporium* spp. and describes some plant diseases caused by them. These include *Colletotrichum Pollaccii* on *Aucuba japonica* Thunb., *C. Pisi* on *Pisum sativum* L., and *Gloeosporium Castanicolum* on *Castanea pubinervis*. The physiological work deals with the effect of H_2SO_4 , H_3BO_3 and NaOH on the growth of the fungi. The 1st was strongly toxic even in weak solution, the other 2 were less so. Addition of peptone to media containing cane sugar led to conidial formation. Best results for mycelial growth and conidial formation were obtained with 2% cane sugar and 0.5% peptone.—*From author's abstract (Courtesy Japanese Jour. Bot.)*

575. HEMMI, TAKEWO. On the pathogenesis of some parasitic fungi causing the anthracnose in some plants. (Japanese.) *Jour. Agric. Dendrol. Soc. Sapporo* 13: 55-64. 1921.—The pathogenesis of the following fungi was studied by inoculation experiments: (1) *Gloeosporium foliicolum* Nishida on leaves of *Citrus*. In repeated inoculation experiments the fungus has given a positive result in some kinds of *Citrus*. From the results the author thinks that this fungus attacks orange leaves when they have some physiological disturbance or are mechanically injured.—(2) *Glomerella Mume* (Hori) Hemmi on leaves of *Prunus Mume*. The pathogenesis of this fungus has not been hitherto experimentally studied. Repeated inoculation experiments on the leaves of *P. Mume* have given a positive result in all cases. It was negative on *P. persica*.—(3) *Gloeosporium euonymicolum* Hemmi on the leaves of *Euonymus*. Inoculation experiments were made on the leaves of *E. japonica* and its variety *radicans*, either with or without cinisins; in both cases strong positive results were obtained.—*S. Hori (Courtesy Japanese Jour. Bot.)*

576. HEMMI, TAKE[w]o. Two anthracnoses on *Rhus* plants. (Japanese.) *Jour. Agric. Dendrol. Soc. Sapporo* 13: 25-54. 1 pl. 1921.—I. The Anthracnose of *Rhus semi-alata* attacks young green shoots, petioles, and leaf-veins of seedlings. Lesions on branches are mostly solitary, long elliptical or spindle-shaped, black, depressed, often with 2 or 3 well defined longitudinal cleavages in the center. In advanced stages numerous salmon-colored pustules appear; lesions often coalesce and girdle the branch which is then killed.—Sori are irregularly scattered, 1st under the epidermis; then they extrude and become light pinkish or salmon colored. Conidia are colorless, but light pinkish or salmon-colored in accumulation, mostly cylindrical, long elliptical or long spindle-shaped, frequently curved or narrower at one end. They measure $9-22 \times 3.6-6\mu$, commonly $10-18 \times 4-5\mu$. Bristles, which are rarely present, are $35-50\mu$ long, $4-5\mu$ broad at lower part, mostly straight, brownish black, with septum obscure.—In culture on several agars (corn-meal decoction, soy, and almond decoction, pepton-sugar) the fungus produces abundantly the salmon-colored conidia-mass. In fluid media none develop.—In hanging drop culture the germination of conidia takes place within a few hours at $25^\circ C$. At its beginning the conidium is 1-septate at the center, and the germinal tube protrudes near both ends. Appressoria are frequently formed at the end of the germinal tube or hypha.—In inoculation experiments on seedlings of *R. semi-alata* and *R. vernicifera* the fungus has shown always a strong positive result on the former, negative on the latter. On fresh apple fruits of various kinds it has a very feeble pathogenic power or none at all.—An experiment made to test whether the conidia in perfectly dry condition could survive the cold winter of Sapporo has indicated that few of them are able to do so.—Another experiment was

made to test the resisting power of conidia of the *R. semi-alata* fungus, together with that on *R. vernicifera* (Hemmi's fungus, not Fukui's, see below), flax, orange fruits, and lettuce against tartaric acid. It was found that conidia of the fungi on *R. semi-alata* and *R. vernicifera* (Hemmi) are much more resistant than the one on flax, and almost equally resistant to that on orange fruits and lettuce.—II. The Anthracnose of *Rhus vernicifera*. The causal fungus has been identified as *Colletotrichum rhoinum* F. Tassi by Fukui. The author obtained diseased leaves from the latter author, but the specimens were so damaged during transport that he was not able to detect the causal fungus. However, keeping the moistened, diseased leaves in a sterilized Petri dish, numerous light pinkish masses appeared. The pure culture of the last fungus was repeatedly inoculated on leaves of *R. vernicifera*, but the results were wholly negative, so that whether the fungus isolated is really identical to that of Fukui is not yet certain; hence he calls the one isolated by himself "Hemmi's fungus."—Lastly, the author has entered into the nomenclature discussion. Though the fungus on *R. semi-alata* resembles *Colletotrichum rhoinum* F. Tassi or *Myxosporium Rhois* (B. & C.) Sacc., it differs in many respects, as, for example, in its host, parts to be infested, etc.; it may, therefore, be a new species, parasitic only on *R. semi-alata*.—*S. Hori*. (Courtesy Japanese Jour. Bot.)

577. HESLER, L. R. Preparing for a big strawberry crop. Amer. Fruit Grower 44⁶: 9-10, 19. 1924.—The diseases of strawberries are discussed with reference to their nature and effect on the part of the plant attacked. Rots of the fruit are also discussed, gray mold rot, which is primarily a field rot, and "leak" or Rhizopus rot, which is primarily a transportation disease, being treated at some length. It is held that most of the spoilage starts in the field or packing house. A general outline is also given which sets forth what should be done in dealing with diseases of strawberries. This treats of the necessity of the fruit being free from bruises or wounds, washing precautions, time of picking, temperature factors, spraying for leaf diseases, and of other minor steps to take.—*Arthur S. Rhoads*.

578. HOWARD, W. L. A baffling orchard pest. Amer. Fruit Grower 43²: 26-27, 44, 49-50. Illus. 1923.—The oak fungus root rot (*Armillaria mellea*) is described and the serious importance of this disease is pointed out. The host plants, symptoms of the disease, mode of spread, and remedial measures are discussed.—*Arthur S. Rhoads*.

579. HURSH, C. R. Morphological and physiological studies on the resistance of wheat to *Puccinia graminis tritici* (Erikss. and Henn.) Jour. Agric. Res. 27: 381-412. 2 pl. 1 fig. 1924.—No special importance was found in the relative number of leaf hairs or stomata per unit area. The number of stomata which open and the extent to which they open, are influenced by outside conditions. Varieties do not respond similarly in this regard. As germ tubes require that the stomata be open before entrance can take place, the relative number of open stomata is of major importance. Tracings and photographs of cross sections of stems show that varieties tend to differ in the relative amount of sclerenchymatous and collenchymatous tissues, particularly in the upper peduncle or neck. As mycelium spread is limited to the collenchymatous tissue only, varieties with relatively large amounts of such tissue have larger infected areas, and are likely to suffer more from rust attack. These factors may be influenced experimentally through the nutrition of the plant. Nitrogenous salts tend to increase the relative percentage of stomata which open synchronously. They also lead to more extensive collenchyma tissue formation. These facts are offered as an explanation of the rule of N as a "predisposing agent" to rust injury. Apart from all morphological considerations there is a definite biochemical resistance. Differences are demonstrated in the physico-chemical properties of the sap but no correlations are made between these and rust resistance.—*Author*.

580. LIESE, J. Zur diesjährigen Kiefernshütte. [The pine needle-shedding disease (*Lophodermium Pinastri*, Schrad.) during the current year.] Zeitschr. Forst- u. Jagdw. 55: 339-352. 1 fig. 1923.—A very severe attack of *Lophodermium Pinastri* upon pines calls for prompt attention. In this article the author discusses the history of the disease; the reasons for its present epidemic stage, and measures applicable for its control. The outward evidence of the disease, the shedding of the needles, is a protective measure taken by pines against too rapid transpiration. Infected needles transpire more water than healthy ones, and the tree throws off the diseased bundles (brachyblasts.) The reasons for bad infestation are: the excessive shedding of needles in the spring of 1921, the following dry summer, which pre-

vented the forming of apothecia on these needles; the wet summer of 1922, which permitted an enormous spore production upon the needles lying on the soil, and the following warm winter. Theories concerning the disease are discussed. A well developed root system offers, among other things, protection against drouth, and at the same time, protection against the disease, which is dependent upon the water supply. Source and heredity play a prominent part in immunity against the disease. The best silvicultural preventative measure consists in thorough soil cultivation, which will enable the trees to develop good root systems. This working of the soil also helps to cover up the needles and hasten their decomposition, and secures a better retention of the soil moisture.—*J. Roeser.*

581. MILLS, H. A., AND W. LE GAY BRERETON. Control of "black spot" of apple. A record of the Department's experiments with sprays. Agric. Gaz. New South Wales 35: 591-596. 1924.—The purpose of the experiment was to determine the efficiency of lime-sulphur to control the black spot disease. The experiment was conducted upon a private farm where 6 plats were used, consisting of 2 trees each of the 4 varieties, Delicious, London Pippin, Dunn's, and Granny Smith. Trees were sprayed with (1) Bordeaux mixture, 3 times; (2) Bordeaux mixture followed later by 2 sprayings of lime-sulphur; (3) 2 sprayings with Bordeaux mixture; (4) 2 sprayings with lime-sulphur; (5) 3 sprayings with atomic sulphur; (6) control. Control trees showed 60.5% black spot followed by 36% on those sprayed with atomic sulphur. The least amount of black spotted fruit, 7.8%, came from trees sprayed twice with lime-sulphur. In all cases the variety, Dunn's, showed more spotted fruit than other varieties. The objection to the Bordeaux mixture is the severe russetting, and even cracking effect, which may result under certain atmospheric conditions, especially on some varieties.—*L. R. Waldron.*

582. MIYAKE, ICHIRO, AND KAZUO TAKADA. Studies on two storage-rot fungi of rice. (Japanese.) Rept. Imp. Cent. Agric. Exp. Sta. Tokyô 45: 71-232. 7 pl. 1922.—In northern provinces of Japan, especially along the coast of the Sea of Japan, we meet frequently with a storage-rot of rice which in some cases causes great damage. One might perhaps think that any saprophyte on rice might be the cause of the rot, but actually it was found that it is due chiefly to either of the 2 fungi mentioned below. The one which is locally called "Fukemai" (meaning moist rot of rice), found in the provinces Toyama, Tottori, Nagano, and western parts of Niigata, is due to a species of *Absidia*, probably a new species. The other, popularly named "Mosumai" (meaning swollen rot of rice), found in the provinces Miyagi, Shimane, and eastern parts of Niigata, is caused by *Penicillium commune* Thom. These 2 rots show very similar symptoms. Rot is most severe in the central part of the mass and becomes gradually less intense towards its periphery. At 1st the attacked rice loses its lustre, and then becomes covered with aerial mycelia; the color of the attacked rice is somewhat darker in "Fukemai" than in the other. The attacked rice later becomes swollen and moist, forming a large mass of grains connected by aerial mycelia; at last it assumes the form of brown mummified grains. In attacked polished rice the color changes to reddish brown in the case of *Absidia*, while in that of *Penicillium* it becomes somewhat yellowish brown. These 2 fungi are able to penetrate into rice grains and develop aerial mycelia when the water content is 16% or more, and may continue to live there, even when it is less than 16%. The change of the percentage of the chief constituents of rice in consequence of the rot is very remarkable, and may be summarized as follows (80 days culture; + increase, - decrease):

	<i>Absidia</i>	<i>Penicillium</i>
Water.	+35.756	+43.635
Crude protein.	-8.61	-34.40
{ Protein.	-24.73	-41.63
{ Amides.	-31.70	- 4.23
Crude fat.	-2.08	-43.87
Crude fibre.	+194.12	+410.78
Starch (determined by Bertrand's method).	-52.25	-90.11
Nitrogen-free extract.	-13.35	-82.96

The authors have also described various physiological phenomena, such as the influence of various substances towards spore germination, the nutrients and their concentration, the enzymes, the behavior of the fungi towards the supply of O₂, temperature, light and various substances, the acidity of the infected rice, its toxicity for animals, etc.—*Authors.* (*Courtesy Japanese Jour. Bot.*)

583. NISIKADO, Y. Ueber die durch *Physalospora* und *Coniothyrium* verursachten Krankheiten der Weintraube in Japan. [Diseases of wine grapes in Japan due to *Physalospora* and *Coniothyrium*.] Ber. Ohara Inst. Landw. Forsch. 2: 273-289. 1923.—Stems on which grapes are borne are often parasitized by *Physalospora baccae* Cav. when the grapes approach maturity, but this fungus has never been found upon the canes or leaves. Grapes of the vinifera type are susceptible; those of the labrusca type are resistant. Pure cultures grown on rice-straw-agar grew best at pH 4.2-7.4. *Coniothyrium Diplodiella* attacks the ripe and unripe berries or stems. In moist weather it may attack young canes. Inoculation experiments and characters of the fungi in pure cultures are described.—H. S. Reed.

584. PETCH, T. "Thread blight" (Draadjes-ziekte). (Translated in Dutch; by Ch. B[ernar]d.) Thee 4: 13-16. Pl. 2-4. 1923.—Berkeley's early reference of thread blight of tea in north India to a species of *Corticium* was probably a mistake as was Masee's later reference of similar material to *Stilbum nanum*. Three types of thread blight fungi are found. Very thick cell walls and thin septa indicate *Corticium* spp., such as *C. Theae* and *C. gardeniae*. However, the *Corticium*s which cause black rot of coffee in southern India (*C. Koleroga*) and of tea in Ceylon (*C. sp.*) do not produce thread blight. A 2nd type of thread-blight mycelium is irregular, with few septa and sometimes thickened walls; species of *Marasmius* cause this type on cacao in western Africa and on tea in Ceylon. A 3rd type of thread blight fungus, limited to Ceylon, India, Sumatra and Java, has special anchor cells. In Ceylon the most common thread blight is that due to *Marasmius pulchra*; it is not harmful. This harmless epiphyte and also the one with the anchor cells occur in India. The investigators who have differed in opinion as to the harmfulness of thread blight had probably made their observations on different fungi. Specimens received on tea from Sumatra include the anchor cell organism, which is identical with the spiderweb disease of Java coffee described by Zimmerman; and also a *Corticium* thread blight, probably *C. Steuensis*. The anchor-cell fungus can kill small stems but not large ones. The thread blights are not serious parasites; they are to be combated by pruning and destroying small infected twigs, and treating larger infected stems with a lime-containing mixture, such as Bordeaux.—Carl Hartley.

585. RHODES, ARTHUR S. Grape diseases, with special reference to black-rot and anthracnose. Florida State Plant Bd. Quart. Bull. 8: 102-112. 1924.—Black rot, *Guignardia bidwellii* (Ell.) V. & R. is controlled by applications of 4-3-50 Bordeaux mixture, 1st, when the shoots are 8-12 inches long; 2nd, just after the blossoms are swelling and before they begin to open; 3rd, after the blossoms have fallen and the fruit is set. The addition of 1 pound of a calcium caseinate spreader to each 50 gallons of Bordeaux mixture will be found of value in increasing the spreading and adhesiveness of the mixture. The remaining applications should be made at intervals of 10 days to 2 weeks, depending upon the weather and the severity of the disease. To secure satisfactory results, the spraying must be timely and thorough so as to cover as nearly as possible the entire surface of the foliage, shoots and fruit with a fine spray. Covering the bunches with paper bags of a good quality soon after the blossoms fall and fruit has set is usually an effective means of preventing black rot. Anthracnose (*Sphaceloma ampelinum* De By.) is controlled by cutting out and burning all diseased canes. For control, spray the vines thoroughly with lime-sulphur (1 gallon commercial lime-sulphur to 9 gallons water) while dormant, preferably just before growth starts in the spring; and plow the vineyard in the spring in order to bury all fallen mummied fruit. During growing season the vines should be sprayed with Bordeaux mixture.—J. C. Th. Uphof.

586. RHODES, ARTHUR S. Ripe-rots of grapes and the copper acetates as non-staining sprays for late applications to control them. Florida State Plant Bd. Quart. Bull. 8: 97-102. 1924.—One or more ripe-rot fungi ordinarily begin the attack when the grapes start to ripen. Not only do they attack grapes while ripening but they may continue their development saprophytically after the grapes have been harvested. The rots are produced within a few days, but cause little damage during dry seasons. In the Southern States, *Melanconium fuligineum*, *Coniothyrium diplodiella* and *Glomerella cingulata* are the cause; the 1st 2 are of most importance. An application of Bordeaux mixture is not even desirable because of the chalky blotches of spray residue left on the fruit. Control is difficult. The Cu acetates form less conspicuous deposits than the cuprammonium sprays and, for the equivalent amount of

Cu, are many times less injurious to the plants. The adhesiveness of the Cu acetates depends upon the degree to which they decompose on drying, and upon the length of time that elapses between the application and the 1st washing rain.—*J. C. Th. Uphof.*

587. SELBY, A. D. Fungus diseases of the apple. Amer. Fruit Grower 43²: 9, 14. *Illus.* 1923.—The prevalence of apple scab in Valdivia, Chile (South America), is reported and the extensive infection is attributed to the high annual rainfall.—The major apple diseases of the Ohio Valley are outlined and a spray schedule recommended for their control.—*Arthur S. Rhoads.*

588. SUEMATU, NAOTUGU. Ueber die gegen die Helminthosporiose widerstandsfähigen Sippen der Reispflanze. II. [Rice varieties resistant to helminthosporiose.] (Japanese.) Jour. Sci. Agric. Soc. 222: 155–160. 1921.—The author studied the resistance of various rice varieties against the disease in Japan, called “Gomahakarebyô,” caused by *Helminthosporium Oryzae*. Results with 116 races are given.—*Author.* (Courtesy Japanese Jour. Bot.)

589. SUEMATU, NAOTUGU. Ueber die gegen die Helminthosporiose widerstandsfähigen Sippen der Reispflanze. III. [Varieties of rice resistant to helminthosporiose.] (Japanese.) Jour. Sci. Agric. Soc. 233: 91–98. 1922.—This is a continuation of infection experiments previously reported. (See preceding entry.) The author calls attention to the facts that, in all, he has investigated 368 varieties of rice of which 50 are more or less resistant to the disease, and none are entirely immune.—*Author.* (Courtesy Japanese Jour. Bot.)

590. TOCHINAI, YOSHIHIKO. On the aecidial stage of the red rust of wheat, *Puccinia trititica* Eriks. (Japanese.) Jour. Plant-Protect. 9: 63–71. 1922.—H. S. Jackson and E. B. Mains proved by experiment that *Puccinia trititica* Eriks. forms its aecidium on *Thalictrum*, and they also found differences in susceptibility among the species of the genus (1920). The author has carried out infection-experiments with sporidia of *Puccinia trititica* Eriks. on *Thalictrum minus* L. var. *elatum* Lecoy, which is the most common species of *Thalictrum* in Hokkaido. The result of the experiments was positive. According to Jackson and Mains, *Thalictrum minus* is resistant to *Puccinia trititica* Eriks. in America, but the Japanese variety, *Thalictrum minus* L. var. *elatum* Lecoy., is very susceptible in Hokkaido.—*Author.* (Courtesy Japanese Jour. Bot.)

591. TROWBRIDGE, P. F. Experiment station progress. Report of director, July 1921, to June 30, 1923. North Dakota Agric. Exp. Sta. Bull. 174. 29–35. 1924.—Wilt resistant fiber varieties of flax are readily developed, and an excellent quality of fiber can be grown in North Dakota. The use of fertilizers does not appreciably control root and seed diseases. No beneficial treatment has been found for black point (*Helminthosporium* sp.) disease in durum wheat. Studies are being made as to the cause of flax wilt immunity. Specific globulins and albumins are extracted and used for inoculation into animals for the development of specific anti-bodies. A combined formaldehyde and salt treatment for ergot and smut has not proved successful.—*L. R. Waldron.*

592. WEISS, FREEMAN. The group reaction of potato varieties to wart disease. Potato News Bull. 1⁶: 18–19 [87–89]. 1924.—Further tests of American potato varieties for reaction to wart have extended and corrected previous information. As a result, it is found that the varieties collected into horticultural groups by Stuart in general react similarly toward this disease.—*Author.*

593. WELLES, COLIN G. Studies on a leaf spot of *Phaseolus aureus* new to the Philippine Islands. Phytopathology 14: 351–358. Pl. 24. 1924.—The disease was 1st observed in September, 1921, on the leaves of *Phaseolus aureus* Roxb. at the College of Agric., Los Banos, P. I. Leaves, stems and pods are attacked. The plants ultimately become defoliated and diseased pods develop but few seeds. The causal organism is *Cercospora cruenta* Sacc. A comparison was made between this organism and *Cercospora lussoniensis* Sacc. on *Phaseolus lunatus*. The organisms differ but little morphologically. However, inoculations into *Phaseolus aureus* showed different host reactions.—The disease can be controlled with Bordeaux mixture, but the treatment is too expensive. A change of cultural methods or the development of resistant varieties is suggested.—*Adeline Ames.*

594. WINSTON, J. R. Spraying for citrus scab. Citrus Indust. 4²: 12–13. 1923.—Citrus scab outbreaks are said to be dependent upon a wide range of conditions involving complications too numerous and intricate to be enumerated. It is stated that just which particular

application will afford the most protection in a given year can not be foretold with accuracy. Since no one can predict with certainty several months in advance just what weather will prevail during the scab season 3 spray schedules have been drawn up to meet the varying degree of citrus scab outbreaks as they occur in Florida groves. From 3 to 4 applications are recommended in each schedule, the function of each application being clearly stated. Bordeaux mixture or Bordeaux-oil emulsion have proved very effective against citrus scab; lime-sulphur has been only partially so. Dusts, either as sulphur compounds or as copper compounds, have not been effective against citrus scab.—*Arthur S. Rhoads.*

595. WINSTON, JOHN R., AND JOHN J. BOWMAN. Commercial control of melanose. *Citrus Indust.* 44: 14-16. 1923.—Melanose, due to the same fungus (*Phomopsis citri* Fawcett) that causes a large part of the stem-end rot of citrus fruits, is described, together with the way in which infections take place. Young orange fruits are said to be susceptible to melanose infection from blossoming time until they reach a size of about $1\frac{1}{2}$ – $1\frac{3}{4}$ inches in diameter and grapefruit until they are about $2\frac{1}{2}$ –3 inches in diameter. The foliage is said to be susceptible until about the time the leaves begin to harden and turn dark green in color. Although pruning out the dead wood as a means of preventing melanose infections in the average bearing grove has been recommended for a number of years, it has not been found commercially practicable and has not been adopted generally. Spraying experiments covering a period of 3 years are discussed and a tentative spray schedule for the control of melanose, based on the use of 3–50 Bordeaux mixture plus 1% oil as oil emulsion, is presented. Directions are given for the preparation of this Bordeaux-oil emulsion spray. When melanose is controlled, stem-end rot is said to be reduced.—*Arthur S. Rhoads.*

DISEASES CAUSED BY BACTERIA

596. DAY, L. H. Control of pear blight in California. *Amer. Fruit Grower* 43: 3, 12. *Illus.* 1923.—A new method of arresting the development of pear blight (*Bacillus amylovorus* (Burr.) Trev.) cankers, having the promise of greatly simplifying the work of saving affected branches, is described. In this method advantage is taken of the fact that the disease 1st travels in the outer bark for some time before penetrating inwardly to the cambial layer. The method of treatment consists in shaving off or scarifying the outer diseased bark until streaks of healthy, white inner bark begin to show through the discolored and diseased outer bark and applying a penetrating disinfectant. The best disinfectant found is a combination of cyanide of Hg and HgCl₂. This disinfectant is made by dissolving in 1 pint of H₂O eight $\frac{1}{2}$ -gm. tablets of each of these mercury salts and adding to this 3 pints of commercial glycerine. Without the glycerine the disinfectant evaporates too rapidly to permit deep penetration into the diseased inner bark and was found to be much less efficient. In addition to scarification, attempts were made to find chemicals which would penetrate the outer suberized bark without previous tree surgery and kill the bacteria in the advancing margin of the canker in the outer bark without killing the cambium. Those giving some promising results were cresylic acid, AgNO₃ in HNO₃, HNO₃, ZnCl₂, Zn(NO₃)₂, I and I salts. ZnCl₂ appears to be most promising. The results of these chemical treatments without scarification of the bark are entirely experimental and their use is not advised.—*Arthur S. Rhoads.*

597. ISHIYAMA, SHIN'ICHI. Studien über die Schwarzfleckenkrankheit der Pflaumen. [Studies of the blackspot disease of plums.] (Japanese.) Mitteil. Kaiserl. Zentralb. Landw. Versuchssta. Tokyo 45: 267–277. 1922.—A disease of *Prunus communis* resembling Smith's "black spot disease of plums" (*Sci.* 17: 456–457. 1903) very frequently occurs in our plum orchards and is often taken for an anthracnose. The author began his studies of this disease in 1913 and in 1915 was able to establish the fact that it is due to *Bacterium pruni* E. F. S. Since all inoculation experiments on unwounded fruit always gave negative results the author began to doubt the accuracy of Smith's "stomatal infection." Inoculation experiments have been repeated frequently but with no single case of undoubted stomatal infection. Anatomical studies of inoculated parts also gave no evidence of such infection. The author, therefore, comes to the conclusion that this is a wound disease.—*Author.* (Courtesy Japanese Jour. Bot.)

598. ISHIYAMA, SHIN'ICHI. Studien über die Weissfleckenkrankheit der Reispflanzen. [Studies of the white-spot disease of rice plants.] (Japanese.) Mitteil. Kaiserl. Zentralb. Landw. Versuchssta. Tokyo 45: 233-261. 1922.—White-spot of rice is a widely spread infectious disease in various sections of Japan. In affected plants the leaf margins die, disease centers being formed within the vascular bundles with resulting stoppage of the H_2O supply. The crop is thereby reduced by as high as 20%. The disease is due to a wound parasite, uninjured plants never becoming infected. Although the pathogene, *Pseudomonas Oryzae* Uyeda & Ishiyama, strongly resembles *P. Stewarti* E.F.S., the 2 can be distinguished by certain physiological characters as well as by cross inoculation tests. It is to be noted that a *Bacillus* closely resembling *B. Oryzae* Hori & Bokura constantly accompanies this organism. Both species live a long time in the soil, constantly occurring in air and water, and, therefore, greatly increasing the probability of rice plants becoming infected.—The diagnosis of *P. Oryzae* follows: Rods 1-2 \times 0.5-0.8 μ , usually single, seldom in pairs, motile by means of 1-2 polar flagella; no spores; Gram-negative; no liquefaction of gelatin; pale to deep yellow colonies on agar or other media, glistening, smooth and flat in plate culture, flattened in stab culture; obligate aerobic, development arrested by CO_2 , no reduction, small amounts of acids produced, no NH_3 formation, milk not coagulated but peptonized in old cultures, no indol reaction, no CO_2 or other gas formed, no water-soluble pigment; optimum temperature 25-30°, thermal death point 53°C.—*Author.* (Courtesy Japanese Jour. Bot.)

599. STILING, FRANK. The present status of citrus canker. Citrus Indust. 4th: 22, 24. 1923.—A summary of the present status of citrus canker (*Pseudomonas citri* Hasse) in Florida is given, together with a description of the intensive methods used in its extermination. Citrus canker was brought into Florida on diseased nursery trees and had spread to and become established in 510 citrus groves and nurseries in 22 counties before its entire distribution was known. Florida has been engaged in the eradication of citrus canker for nearly 10 years and this work is classical as a piece of disease eradication work. The State Plant Board of Florida, in cooperation with the Bureau of Plant Industry of the U. S. A. Dept. Agric., has had as many as 418 trained inspectors engaged on the work in Florida. The cost to the state and federal governments, corporations, and individuals has been estimated to be in the neighborhood of $\frac{1}{2}$ million dollars, and has included the destruction of 248,725 grove trees and 2,955,768 nursery trees (these figures represent trees destroyed on account of being affected or exposed to infection) and considerable loss brought about by decreased property values. Infected properties have received weekly inspections from the time infection was first found until the groves were considered entirely free from this disease. All citrus plantings within 1 mile of infected properties have been inspected every 3 months and the entire state has been covered 3 times. The field inspectors have made over 53,000,000 grove tree inspections and over 203,000,000 nursery tree inspections. A total of 357,410 grove and nursery trees have been actually found infected with canker and destroyed. Some 30,000 pounds of formaldehyde has been used in the disinfection of soil and trees and some 7,500 pounds of $HgCl_2$ tablets have been used in disinfecting the "canker suits," shoes, leggings, and hats of the inspectors. Without a doubt, citrus canker has been the worst citrus disease ever introduced into the groves of Florida and, had it not been for the very drastic measures adopted by the State Plant Board, Florida's entire citrus industry would surely have been reduced to such a point that profitable citrus culture would by this time have been a thing of the past.—*Arthur S. Rhoads.*

600. TAKIMOTO, SEITO. Studies on the putrefaction of vegetables. (Japanese.) Jour. Plant-Protect. 8: 344-353. 1921.—Experiments were performed to study the behavior of the causal organisms of a disease which has caused the putrefaction of several kinds of vegetables in Corea since 1914-1915. Different kinds of bacteria were isolated from diseased parts of vegetables, such as radish, beet, cabbage, Chinese cabbage, turnip, celery, carrot, leek and onion. Comparative studies were made in respect to their forms, staining reactions, behavior in various culture media (agar, gelatine, bouillon, etc.). Inoculation and serum reaction experiments were also carried out.—The author's general conclusions are as follows: (1) Bacteria isolated from radish, turnip, Chinese cabbage, and beet are identical in their form and staining reactions, as well as their behavior in culture media. Those from cabbage differ somewhat from those named above in respect to their form and behavior in

potato culture. Those from celery and lettuce agree perfectly with each other and differ somewhat from those of radish in form and behavior in culture media. Those from carrot are entirely different from others in all respects. Those from leek and onion are perfectly similar to each other.—(2) Serum reaction experiments indicate that bacteria from radish, lettuce and celery belong to the same strain.—(3) If we judge our bacteria according to their form and behavior in culture media we may conclude that those from radish correspond to *Pseudomonas destructans* Pott.; and that those from carrot, and those from onion and leek are similar to *Bacillus caratovor* Jones and *Bacillus aroideae* Towns., respectively.—*Author.* (*Courtesy Japanese Jour. Bot.*)

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

601. ARANGO, R. Una plaga las anonaceas en Cuba. [A plague of the Anonaceae in Cuba.] Mem. Soc. Cubana Hist. Nat. "Felipe Poe" 5: 79-82. 1923.—An insect plague of the fruits of *Anona squamosa*, *A. muricata* and *A. reticulata* due to *Bephrata cubensis* is described.—*J. A. Faris.*

602. BROOKS, FRED E. The cambium curculio, *Conotrachelus Anaglypticus* Say. Jour. Agric. Res. 28: 377-386. 3 pl., 1 fig. 1924.—The history and distribution, food habits, nature of injury, description, biology and control of the cambium curculio are discussed.—In attacking the cambium of trees these curculios work around the margins of wounds, retarding the process of healing and inducing hypertrophy of injured areas.—*Frederick V. Rand.*

603. BROWN, NELLIE A. An apple stem-tumor not crown gall. Jour. Agric. Res. 27: 695-698. 3 pl. 1924.—For years certain small stem-tumors of apple trees have been considered by pathologists and entomologists to be a form of crown gall. As no one had ever proved it, the author undertook to do so. Nearly 500 plates were poured from apple stem tumors received from various parts of the U. S. A. *Bacterium tumefaciens*, the crown gall organism, was not found present in any of these tumors. While the work was in progress, attention was directed to the presence of the woolly apple aphid on young apple stems free from tumors and on old stems covered with tumors. The subsequent appearance of tumors on these young stems, on which the woolly aphid was noted and the continued growth of the tumors during the summer and fall pointed to the aphid as the agent responsible for these outgrowths. [See also Bot. Absts. 13, Entry 4551].—*Author.*

604. C., H. La "Bete à Patates" en Europe. [The potato beetle in Europe.] Nat. Canadian 49: 268-272. 1923.—The presence of potato beetles was first noted at Bordelais on the 9th of June, 1922, and within a month they had spread throughout the Cantons of Blanquefort and Castelnau, France. These insects were probably introduced in 1919 or 1920 with imports from the U. S. A. In the absence of potatoes, *Doryphora (Leptinotarsa) decemlineata* Say, attacks tomatoes, aubergines, some varieties of tobacco, and even belladonna, bittersweet and cabbage.—*A. H. MacKay.*

605. COHEN STUART, C. P. Iets over den steek van *Helopeltis*. [Notes on the puncture of *Helopeltis*.] (With English summary on page 61.) Mededeel. Proefsta. Thee, Dept. Landb., Nijv. en Handel (Dutch East Indies) 81: 24-25. 1922.—The beak of the insect is found to pass between, rarely through, the cells; its tip touches the vascular bundles, usually the phloem tubes.—*Carl Hartley.*

606. MANUEL, H. L. Root knot in the vineyard. Agric. Gaz. New South Wales 35: 581-588. 2 fig. 1924.—A popular discussion of *Heterodera radicola* is given and methods of control are suggested.—*L. R. Waldron.*

607. MENZEL, R. [Dutch rev. of: STEINER, G., AND HELEN HEINLY. The possibility of the control of *Heterodera radicola* and other plant-injurious nemas by means of predatory nemas, especially *Mononchus papillatus* Bastian. Jour. Washington [D. C.] Acad. Sci. 12: 367-386. Illus. 1922.] Thee 4: 22-24. 1923.

608. MIGONE, L. E. Flagelados de las plantas. Variaciones sufridas por los parásitos en su multiplicación en los medios nutritivos artificiales a base de sangre, especialmente de sangre humana y agar. [Flagellosos de plants. Variation of the parasite on artificial media.] Rev. Soc. Cien. Paraguay 13: 35-39. 8 fig. 1922.—During a study of the flagellates of latex-bearing plants in Asuncion, Paraguay, a *Leptomona* was found in great abundance parasitizing

Morrenia odorata. This proved to be a new species and was named by França *Leptomona Bordasi* França. The various forms occurring in the latex and on various media are described in detail. Inoculations into guinea-pigs of latex containing the flagellate and also of artificial cultures resulted in an intense irritation at the point of inoculation, fever, tonic and clonic spasms and death.—*Lillian C. Cash*.

609. MONTEMARTINI, LUIGI. La lotta contro i maggiolini in Provincia di Como. [The fight against cockchafers in the province of Como.] Atti Ist. Bot. Univ. Pavia Ser. III. 1: LXV-CXVIII. 2 maps. 1924.—This is an extensive report on the progress and means of combating the cockchafers, *Melolontha vulgaris* F., and *M. hippocastani* F. in the Province of Como, Northern Italy.—*P. D. Caldis*.

610. MOORE, WILLIAM, AND F. L. CAMPBELL. Studies on nonarsenical stomach-poison insecticides. Jour. Agric. Res. 28: 395-402. 1924.

611. STRONG, RICHARD P. Investigations upon flagellate infections. Amer. Jour. Tropical Med. 4*: (1-56). Pl. 1-6 (2 col.). 1924.—“In studying certain infectious diseases of plants and in searching for animal parasites in the latex of various tropical plants in Central and South America, a flagellate parasite was discovered in 3 species of Euphorbiae. This flagellate is of the leptomonas type and is not dissimilar in appearance to the flagellate stage of *Leishmania tropica* giving rise to a form of tropical ulceration of the skin. In 1 district in Panama a very extensive phytodemic of the infection in Euphorbiae was found to exist. These plants were very abundant in this region and almost every one was found infected. The infected plants showed pathological changes, and the latex of the plant was also distinctly altered,—the flagellates causing disturbances in the circulation of the plant, sometimes forming emboli in the lactiferous channels. The nutrition of the plant was thereby distinctly disturbed and many of the plants became atrophied.—The insect *Chariesterus cuspidatus* transmitting the infection from the plant to a species of lizard *Cnemidophorus lemniscatus* was also discovered. From extensive experiments upon animals it was demonstrated that the flagellate as it occurs in the plant and also in the intestinal tract of the insect, is not pathogenic for vertebrates. However, after the flagellate has passed through the insect to the lizard, it acquires pathogenic properties and may give rise to a form of tropical ulceration of the skin, as was demonstrated from experiments in the monkey. In this ulceration the leishmania form of the parasite and not the flagellate stage is encountered. . . . This apparently is the 1st instance of this nature in which such a chain of infections has been demonstrated.”—In addition to a general discussion of this investigation the author takes up the experimental phases in great detail.—*Frederick V. Rand*.

612. WALKER, W. M. Spray gun versus nozzle. Their comparative efficacy against woolly aphids. Agric. Gaz. New South Wales 35: 589-590. 1924.—A combined spray of arsenate of lead and tobacco wash was used for codlin moth on the apple variety, Dunn. A greater amount of spray was required through the spray gun than through the nozzle, but less time was required for distribution. It was found later in the season that woolly aphids developed much more rapidly on the nozzle-sprayed trees than on the gun-sprayed. For the autumn washing a very appreciable increase of time and material was required for treating the previously nozzle-sprayed trees in comparison with the previously gun-sprayed trees. It is concluded that the gun spray is more efficient for woolly aphids but indecisive in regard to codlin moth.—*L. R. Waldron*.

613. WARDLE, ROBERT A., AND PHILIP BUCKLE. The principles of insect control. xvi + 295 p., 32 fig. Longmans, Green & Co.: London & New York, 1923.—Pt. 1 deals with biological control, including host resistance, climatic restraints, disease, parasites and predators, and bird encouragement.—Pt. 2 takes up chemical control and includes insecticides, dips and dressings, attractants and repellants, and fumigants.—Pt. 3 discusses mechanical control including cultural methods, restriction of spread, crop storage, baits and traps.—Pt. 4 deals with legislation.—An appendix includes a discussion of machinery, and a bibliography.—*Frederick V. Rand*.

614. WATSON, J. R. Entomogenous fungi on citrus. Citrus. Indust. 47: 44. 1923.—The need for encouraging the establishment and development of certain entomogenous fungi which very effectively destroy white fly and scale on citrus trees in Florida is pointed out.

Five of these fungi which are considered especially important are briefly described. These are red Aschersonia and brown fungus, which live on white flies, and red-headed scale fungus, white-headed scale fungus and black scale fungus, which live on purple and other scales. A method is described for successfully introducing these fungi into the grove, by spraying the trees with water in which the spores of the fungus or fungi are suspended.—*Arthur S. Rhoads.*

615. YOTHERS, W. W., AND J. R. WINSTON. **Spraying for rust mites and scale insects following spraying for melanose.** *Citrus Indust.* 4^o: 26. 1923.—Since Bordeaux-oil emulsion applied to citrus trees in the spring for melanose control in citrus fruits kills the beneficial entomogenous fungi as readily as the other injurious ones and thus allows the insects to increase rapidly, growers are advised to follow this spraying with an application of lime-sulphur about the 1st of June for control of rust mites and one of straight oil emulsion about the latter part of June for the control of scales.—*Arthur S. Rhoads.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

616. GOLDSTEIN, BESSIE. **Cytological study of living cells of tobacco plants affected with mosaic disease.** *Bull. Torrey Bot. Club.* 51: 261-273. *Pl. 5, fig. 1-2.* 1924.—A study of the appearance of the mosaic bodies in the living cell is presented, these intercellular bodies being found in the epidermis and in hair cells. They are described and figured, and the conclusion is drawn that they cannot be considered as secretion or disorganization products arising from or in the neighborhood of the nucleus. Observations suggest that they may well pass through cell walls and the pores of bacterial filters as the virus has been shown to do.—*P. A. Munz.*

617. HUNGERFORD, CHAS. W., AND B. F. DANA. **Witches' broom of potatoes in the northwest.** *Phytopathology* 14: 372-383. *Pl. 25, fig. 1-4.* 1924.—The article consists of observational data. This disease occurred promiscuously throughout the northwest [U. S. A.] in 1923. It appears to be transmitted through diseased tubers. Plants grown from such tubers produce bushy stems from all the eyes, the petioles elongate and the leaves are far apart. The foliage is often yellow and the blooms set seed balls. Diseased plants decline before ripening and many small potatoes are produced in a hill. Primary infection in healthy plants is indicated by the newer leaves rolling while the margins become reddish yellow. The disease has some of the symptoms common to leaf curl, *Rhizoctonia* and spindle tuber. The cause has not been determined. Environmental factors, time of planting or storage conditions do not appear to control the disease.—*Adeline Ames.*

618. MATSUMOTO, TAKASHI. **Azuki-bean mosaic.** (Japanese.) *Jour. Plant-Protect.* 9: 13-17. 1922.—The disease is a typical mosaic and resembles that of soybean mosaic. The mesophyll of the dark-green parts of the diseased leaves is strikingly thicker than that of the light-green parts. The palisade cells of the former are markedly longer and narrower than those of the normal tissues. The corresponding cells of the light-green parts are more or less isodiametric, and show a tendency to crowd closely together. Starch is more abundant in the dark parts, regardless of time of day. Sugar is also more abundant in the dark-green parts than in the light-green parts. Some preliminary tests on varietal susceptibility have been made in a limited area.—*Author.* (*Courtesy Japanese Jour. Bot.*)

PHANEROGAMIC PARASITES

619. MONTEMARTINI, LUIGI. **Le Cuscuta nei Medical della Valle Padana.** [Dodder on alfalfa in the Padus Valley.] *Atti Ist. Bot. Univ. Pavia Ser. III, 1: XLIX-LXIII.* 1924.—In a report to the Ministry of Agric. the author describes the seriousness of infection of alfalfa fields with *Cuscuta* sp. in the Padus Valley, where a damage of 50 million lire was caused in 1923. The *Cuscuta* is spread chiefly through contaminated seed but also by irrigation water, manure and farm implements. Clean seed and destruction of centers of infection by a 5-year rotation is recommended for severe cases and by chemicals in mild cases. A bibliography, list of *Cuscuta* species identified, and copy of the questionnaire blanks sent to the growers are appended.—*P. D. Caldis.*

NON-PARASITIC DISEASES

620. BROOKS, CHARLES, AND D. F. FISHER. New method of controlling apple scald. Amer. Fruit Grower 43⁸: 3, 12, 28. 1923.—The characteristics of apple scald and the remedies for this storage trouble are discussed, together with the value of oiled wrappers in absorbing the by-products of respiration which bring about scald of the fruit unless absorbed or carried off by aeration.—*Arthur S. Rhoads.*

621. [BURGER] BERGER, O. F., AND E. F. DEBUSK. Green spotting of citrus fruit. Reprint Florida Agric. Exp. Sta. Press Bulletin No. 342. Citrus Indust. 4¹: 17. 1923.—Green or brownish-green spots appearing on pre-colored citrus fruit are said to be due to rough handling which bruises the oil cells. The liberated oil spreads over the surface of the fruit and injures the rind, the area of the injured rind depending upon the amount of oil liberated. After the fruit has been put through the pre-coloring process the injured spot either remains green or turns a greenish-brown. The cause of this injury was demonstrated experimentally, as follows. Oranges of 1 lot were bruised by the blunt end of a lead pencil so as to break the oil cells; those of a 2nd lot were treated by dropping on them oil squeezed from the peel of other green oranges; a 3rd lot was treated by applying drops of commercial oil of lemon; and a 4th lot was used as control. All these oranges were placed in the coloring room of a commercial packing house and left for 36 hours. Upon examination after their removal it was found that where the fruit were bruised the areas so injured did not turn yellow but were of a brownish-green color. In the lot where oil was squeezed out of the green rind and placed on the fruit the area so treated remained green. In the lot where the oil of lemon was dropped on the fruit the treated area was of a brownish-green color. Those used for a control were not spotted but were uniformly colored. The relation between the presence of this green spotting and decay in the fruit upon reaching market is also pointed out. The control measures suggested consist in handling the fruit with care so as to avoid bruising, and in avoidance of picking the fruit while it is raining or when the fruit is wet.—*Arthur S. Rhoads.*

622. JOHNSON, MAXWELL O. Manganese chlorosis of pineapples: its cause and control. Hawaii Agric. Exp. Sta. Bull. 52. 1-38. Pl. 1-4 (1 col.), fig 1-5. 1924.—The writer shows that Mn of the highly manganiferous Hawaiian soils is present mainly in the dioxid form; that H-ion determinations indicate these soils to be acid; and that CaCO₃ is absent.—A series of experiments were conducted with rice grown in nutrient solutions to determine the effect of MnSO₄ and MnO₂ on growth where various amounts of Fe were supplied to the nutrient solution from various sources. Preliminary experiments indicated that the effect of Mn depends largely on the amount of Fe supplied by the solution.—When the nutrient solution contained a normal amount of Fe, MnSO₄ and MnO₂ caused a strong chlorosis and a severe depression in growth. This chlorosis was overcome when the leaves were dipped in solutions of Fe salts or the amount of Fe in the nutrient solution was excessively increased.—This manganese-induced chlorosis was thus shown to be due to a depression in the assimilation of Fe or to a deficiency of Fe in the plant. The previous results and conclusions of the writer concerning the manganiferous Hawaiian soils are thus confirmed.—Manganese-induced chlorosis is altogether distinct from lime-induced chlorosis, due to CaCO₃, since Mn-induced chlorosis can and usually does occur under acid conditions. Mn and CaCO₃ can each produce an additive chlorotic effect in the presence of the other.—No evidence was found to show that Mn exerts any stimulating effect on plant growth. With nutrient solutions containing an excessive amount of Fe, MnO₂, by removing some of this harmful Fe, caused an increase in growth.—NaOH titration curves are given for FeCl₃ and FeSO₄. Determination of the solubilities of Fe at different H-ion concentrations show that ferric Fe is completely precipitated while the solution is still strongly acid, and that ferrous Fe is soluble under fairly alkaline conditions.—This difference in solubility of ferric and ferrous Fe affords an explanation of the manner in which Mn induces chlorosis. MnO₂, either present as such or formed from manganous salts, would keep the Fe present oxidized to the much more difficultly available ferric form.—A description is given of field experiments in which solutions of Fe salts were applied to the leaves of pineapple plants on the manganiferous Hawaiian soils. This treatment effected immediate cure of the "toxic effects" of Mn and induced a normal growth. The treatment was quickly adopted by all the pineapple growers having manganiferous soils and is now being regularly used on considerably over $\frac{1}{2}$ of the Hawaiian pineapple fields.—*Author's summary.*

623. LENFEST, R. E. Dieback of citrus trees. *Citrus Indust.* 4¹²: 5-7. 1923.—Observations are given concerning dieback of citrus trees, a physiological trouble, and on phases of this trouble known as ammoniation and frenching. Various grove practices and cultural conditions which contribute to dieback are discussed and remedial measures are recommended.—*Arthur S. Rhoads.*

624. NAMIKAWA, ISAWO. Über die vorzeitige Abstossung der jungen Früchte von *Malus communis*. [Premature dropping of young fruit of *Malus communis*.] *Jour. Coll. Agric. Hokkaido Imp. Univ.* 11: 1-21. 6 fig. 1922.—This paper gives results of observations and experiments relating to the premature falling of fruit of *Malus communis* which was at its height in Hokkaido (north Japan) toward the 1st of July. The author summarizes as follows: (1) At the insertion of the blossom pedicel there is already formed in the young bud a strongly constricted joint; this constitutes the zone of separation. In the fully developed blossom there lies in this zone a characteristic disjunction layer made up of small, pitted, more or less thick-walled cells. The mechanical elements here are very weakly developed.—(2) The character of this disjunction layer shows certain changes during the course of development. At the time the blossoms begin to fall a slow, primary meristematic cell-division is noted here. As development progresses such cell division ceases.—(3) The fruit drop starts a few days after the end of the blooming period and lasts several months. Before separation, a rapid secondary meristematic cell-division and a sudden accumulation of starch grains, oil drops and sugar take place in the disjunction layer. At the same time there is demonstrable a marked decrease of those substances in the fruit flesh.—(4) In sound fruit the osmotic pressure is at the highest in the fruit flesh and only a little lower in the pedicel, but it shows a considerable diminution in the disjunction layer.—(5) The detachment affects not only this layer but also the overlying tissues. The tracheal elements of the vascular bundles are mechanically torn by the weight of the falling fruit.—(6) The isolation of the tissues is brought about by stretching of the cells, the maintenance of osmotic pressure and the dissolution of the middle and secondary lamellae of the cell membrane.—(7) Deprived of the fruit, the pedicel, after a few days, drops also; this is somewhat retarded by smearing the scar with plaster of Paris.—(8) The average number of seed in the fallen fruit is less than in sound fruit.—*S. Ikeno.* (Courtesy Japanese Jour. Bot.)

625. RUTH, W. A., AND W. P. FLINT. Winter injury to peaches in 1923-24. *Amer. Fruit Grower* 44⁸: 5, 16. 1924.—Winter injury to peaches is described with special reference to the symptoms, the weather conditions that favored the injury and the beneficial effect of early applications of NaNO_3 . It was demonstrated that this injury was in no way related to injury resulting from the use of paradichlorbenzene for the control of the peach tree borer.—*Arthur S. Rhoads.*

626. WATERS, R. Loss in weight of stored apples. *New Zealand Jour. Agric.* 28: 268-269. 1924.—Flesh collapse of apples appears to be associated with high relative humidity in storage chambers. Apples held in the packing room for 20 days lost more than twice as much weight as those held in cold storage at a relative humidity of 70-80 for a similar period of time.—*N. J. Giddings.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

627. CHASE, S. O. Decay of citrus fruits in transit. *Citrus Indust.* 4¹⁰: 5, 48. 1923.—Decay of citrus fruits in transit is discussed from the standpoint of the wholesale purchaser, the retailer and the shipper.—*Arthur S. Rhoads.*

628. CHILDS, LEROY. Important factors in good spraying. *Amer. Fruit Grower* 43²: 3, 19, 21. *Illus.* 1923.—A discussion is given of 3 outstanding requirements for good spraying: Proper timing of the different sprays, thoroughness of the work, and the employment of adequate equipment. It is concluded that failures with the spray gun are due to the fact that growers have tried to use it on all types of sprayers.—*Arthur S. Rhoads.*

629. CONGRÉS DE PATHOLOGIE VÉGÉTALE, STRASSBURG, 1923. *Congrès de pathologie végétale tenu à Strabourg, le 4 juin 1923.* 74 p. Imprimerie alsacienne: Strassbourg, 1923.

630. BERNARD, CH. Verstag van het Algemeen Proefstation voor.—Thee over het jaar 1923. [Report of the General Experiment Station for Tea for the Year 1923.] *Mededeel. Proefsta. Thee, Dept. Landb. Nijv. en Handel (Dutch East Indies)* 87: 1-34. 1924.—Root

rot and red rust (*Cephaleuros*) were not serious. Cleft canker (*Armillaria*) in 1 case spread rapidly as the result of the burial of large pruned branches among the plants. Among the green manure plants "Djamoer oepas" (*Corticium salmonicolor*) was found on Tephrosia, and Sclerotium root disease on Tephrosia and Crotalaria.—*Carl Hartley*.

631. BLAKE, M. A. Prominent enemies of the peach. Amer. Fruit Grower 43²: 8, 21, 31-33. *Illus.* 1923.—In addition to a number of insect pests, brown rot, scab, leaf curl, yellows, bacterial leaf spot, powdery mildew, and crown gall are described and control measures given.—*Arthur S. Rhoads*.

632. BROOKS, F. T. Epidemic plant diseases. Trans. British Mycol. Soc. 9: 229-239. 1924.—This is a general discussion of epidemic plant diseases and their causes.—*W. B. McDougall*.

633. BURGER, O. F. Report of plant pathologist. Florida Agric. Exp. Sta. Ann. Rept. 1921: 25R-28R. 1921.—In Gadsden County the root rot of tobacco, *Thielavia basicola* (B. & Br.) Zopf is very severe, making it necessary for growers to move their tobacco shades about every 4 years. Root knot was also found in great abundance and is 1 of the greatest drawbacks to the industry. Granville wilt (*Bacterium solanacearum*) was found on several plantations but never in such abundance as to cause any great loss. The most serious trouble was Peronospora disease on leaves of young plants in the seed bed and also after transplanting. Large brown spots, ranging from $\frac{1}{2}$ to 1 inch in diameter appear on the leaves. Sometimes they coalesce. At first the spots are yellowish green, later water-soaked in appearance.—Among potato diseases, bacterial wilt (*Bacterium solanacearum*) was present in about 75% of the fields. It is believed that bacterial wilt is responsible for a large percentage of slimy rot disease of potatoes on the markets. Rosette was present in some fields but did very little damage. Mosaic greatly reduced the yield. Late blight (*Alternaria solani*) was present in most fields, but caused little damage. Sclerotial blight (*Sclerotium rolfsii*) was present in many fields, causing the plants to rot off at the ground.—As to pineapple wilt, new strains of the Red Spanish variety were secured from Porto Rico, Cuba and Costa Rica, in the hope of finding the organism causing the disease.—*J. C. Th. Uphof*.

634. BURGER, O. F. Report of plant pathologist. Florida Agric. Exp. Sta. Ann. Rept. 1922: 45R-55R. 1922.—It was clearly brought out that the stem-end-rot, due to the same fungus (*Phomopsis citri*) that causes melanose, was accompanied by a physiological change in the fruit. Spraying with bordeaux-oil (3-3-50-1) gave good results. The work on pineapple wilt has been continued, but with no striking results.—Among citrus diseases, blossom-end-rot (*Alternaria citri*) was reported as being serious in 1 citrus grove. Blight of unknown cause was serious, chiefly along the East Coast. Withertip (*Colletotrichum gloeosporioides*) was severe in spring. Foot rot was reported as serious in several old groves as well as in nurseries. From 1 nursery specimens were collected and *Phytophthora terrestris* was isolated. *Septobasidium pedicellata* makes its appearance as a soft felty mat on the stems of citrus. Specimens were received from several localities, but no special damage was reported. From Bradentown considerable damage has been reported as due to an alga (*Cephaleuros virescens*). The affected limbs were killed. Spraying with lime sulphur kept it in check. This alga also occurs on leaves. Citrus canker (*Pseudomonas citri*) occurred near a small town on the edge of the Everglades, where 10 acres of grove were completely destroyed. Red rot of sugar cane (*Colletotrichum falcatum*) was reported from several districts. "White band" of sugar cane was prevalent in several places. In this trouble a white band about 2 inches wide extends across the leaf; the cause is not known.—Many other diseases of crops are briefly mentioned.—*J. C. Th. Uphof*.

635. BURGER, O. F. Report of plant pathologist. Florida Agric. Exp. Sta. Ann. Rept. 1923: 52R-102R. 1923.—Citrus melanose is worse at the base of a tree than at the top because there is generally less dead wood near the top. Potato agar was found to be the best medium for the growth of citrus canker which has been living more than a year in this medium. Wet pine shavings were sterilized and inoculated; the organism reproduced and lived on the wood for several months. When citrus seedlings were inoculated from 1 of these cultures they became infected. Unsterilized muck soil was unfavorable for the development of the organism. Other culture experiments are mentioned.—Green spotting of many of the early oranges

occurred generally over the state. Fruits which were bruised did not turn uniformly yellow but were brownish green spotted. It was experimentally shown that oil liberated due to careless picking, is the cause of this peculiar trouble.—About 6% of the sweet potato plants were affected with mosaic disease. The internodes of the runners were decidedly shortened, and the petioles were shorter and thicker and flattened at the point of union with the blades. Inoculations were unsuccessful. Scab (*Cladosporium citri*) was the most common and probably the most serious of the avocado diseases in Florida. Lead spot (*Gloeosporium Musarum*) on banana caused extensive losses. Southern wilt (*Sclerotium rolfsii*) on bean was prevalent and widely scattered, proving more serious during May and June than during other months of the year. Early blight (*Cercospora Apii*) on celery was found all over the state. No effective absolute control was obtained, except in the seedbeds with Bordeaux mixture. Black heart, of unknown cause, was the most serious and most baffling of the celery diseases. *Cenchrus echinatus* L., a wild grass, was found to be attacked by *Ephelis mexicana*. This fungus developed sclerotia in the sheath of the flag leaves, involving the inflorescence. A large number of other diseases on various crops are presented.—J. C. Th. Uphof.

636. COOK, MELVILLE T. The status of plant pathology in Porto Rico. Jour. Dept. Agric. Porto Rico 7: 3-14. Fig. 1-3. 1923.—Although there are 139 publications dealing with Porto Rican fungi, only a beginning has been made. Maximum agricultural production in the Island is dependent upon further researches in the field of plant pathology. Mosaic, root rot and gummosis diseases of sugar-cane, and tobacco, coffee, citrus-fruit, and pineapple diseases offer particularly urgent problems.—Geo. H. Dungan.

637. DEBUSK, E. F. Causes of citrus fruit decay. Citrus Indust. 5: 34, 38. 1924.—It is concluded that practically all of the losses in culls and decayed fruit can be prevented economically by correcting faulty methods in culture and in handling of the fruit, and by picking at the proper time.—Arthur S. Rhoads.

638. DUCOMET, V., ET ET. FOËX. Les principales maladies de la pomme de terre. Les moyens de les prévenir. La sélection. Conservation des tubercules. [The principal diseases of the potato: means of preventing them, selection, and storage of tubers.] 16 p., 5 col. pl. Publ. Offices Agricoles. Librairie Agricole de la "Maison Rustique." Paris, [1923].—Popular descriptions and colored illustrations are given of the following potato diseases, together with remarks on the nature of the degeneration diseases and on seed [tuber] selection, seed-plot management, and the storage of seed and table-stock tubers: Leafroll, *frisolée* [crinkle or rugose mosaic], mosaic, bigarrure [stipple-streak], panachure [variegation], Phytophthora and Macrosporium blights, surface mildew, Verticillium wilt, blackleg, foot and collar rots, and the ordinary tuber diseases.—F. Weiss.

639. [FLOYD, W. L.] Leading insect and disease pests of Florida. Amer. Fruit Grower 43: 20, 37, 39, 41. Illus. 1923.—Among the diseases of citrus trees, canker, withertip, foot-rot, gummosis, scaly bark, dieback, melanose, and scab are described and remedial measures given, where known.—Arthur S. Rhoads.

640. GARRETSEN, A. J. Bestrijding van plantenziekten. [Combating plant diseases.] Thee 4: 21-22. Pl. V. 1923.—A device for applying sulphur in steam is described as successful in Germany. A very uniform covering of extremely fine particles is obtained on leaves, and the most sensitive plants are said to be uninjured by this form of application.—Carl Hartley.

641. HULL, JOHN C. Is the spraygun a success? Amer. Fruit Grower 43: 12-13. Illus. 1923.—The writer considers that failures with the spraygun have been due to 1 or more of the following causes, the 1st and 2nd being the source of most failures: (1) Insufficient pressure and the capacity of the power sprayer, or interference by undersized valves, hose, and fittings; (2) an incapable man handling the gun; or (3) an imperfectly working or poorly designed gun that lacks capacity, or does not give even, uniform discharge. These causes for failure are discussed and suggestions are made for the correct use of the spraygun. It is claimed that the spraygun is successful when properly used, as is attested by the experience of thousands of growers.—Arthur S. Rhoads.

642. INTERNATIONAL CONFERENCE OF PHYTOPATHOLOGY AND ECONOMIC ENTOMOLOGY. WAGENINGEN AND BAARN, NETHERLANDS, 1923. Report of the international conference of phytopathology and economic entomology. iv + 290 p. 16 pl. (2 col.). Holland, 1923.

643. JONES, LEON K. Diseases and insect enemies of the sour cherry. Amer. Fruit Grower 43²: 16, 28-29. *Illus.* 1923.—Among the fungous diseases, cherry leaf-spot, which is considered the most important cherry disease in Wisconsin, is described and an account given of the spraying experiments conducted for the control of this disease in Wisconsin. During the period of 7 years of experimentation Bordeaux mixture has proved more effective in controlling the disease than any of the sulphur sprays. Moreover, the protection from Bordeaux mixture is said to last over a longer period than that from the sulphur preparations, but there has been some foliage injury. Three applications of 3-3-50 Bordeaux mixture, applied as follows, have given the most satisfactory control: (1) As soon as the petals have fallen; (2) 2 weeks later, and (3) immediately after harvest. Such dusts as copper-lime-arsenate, sulphur-arsenate and sulphur-dry lime-sulphur-arsenate have not proved satisfactory in comparison with the results obtained through the use of sprays.—*Arthur S. Rhoads.*

644. LOVETT, A. L. Spreaders in the poison spray. Amer. Fruit Grower 43²: 18, 30, 33. *Illus.* 1923.—Spreaders are considered of particular merit in combination sprays because they retard chemical reactions among the materials and thus permit each substance to act more nearly to its maximum efficiency. They are likewise considered of merit in the late cover sprays where the heavy, blotchy covering otherwise obtained may be minimized or eliminated entirely.—*Arthur S. Rhoads.*

645. MANDEL, HENRI. Les microbes pathogènes et l'organisme animal. Conceptions nouvelles sur la symbiose somato-parasitaire. [Pathogenic microbes and the animal organism. New conceptions on the host-parasite relation.] 71 p. Masson et Cie: Paris, 1923.—The following phases of the subject are discussed: Contradictions between biological theories and medical practice; the principal causes of these contradictions, natural and artificial infection; the fundamental principals of parasitism in general; the physiological defense of the organism against microbial invasion; the active collaboration between host and parasite in the host-parasite symbiosis, the parasitophile role of symbiosis reactions; confirmation of our conceptions by empirical therapeutics; and explanation of the mechanism of vaccino-therapy and of non-specific therapy in the light of these conceptions.—As a result of the mutual reactions between pathogenic microbe and host the latter often develops special structures which shelter and nourish the microbe, permitting it to increase rapidly, and which thus play an important role in the perpetuation of the parasite. Host barriers may, a priori, have 2 results: (1) preventing a dangerous element from escaping to injure the surrounding tissues, or (2) enabling this element to absorb nourishment from the surroundings in safety. The rose develops a gall structure which protects and nourishes the young generation of the insect parasite. In these host-parasite complexes we have (1) the builder of the barrier (2) the beneficiary of the barrier and (3) an enemy against which the barrier is made. But the builder of the barrier is not necessarily the beneficiary.—*Frederick V. Rand.*

646. MICHAEL, A. B. Decay in transit from the growers' standpoint. Citrus Indust. 4^o: 15, 42. 1923.—The writer is of the opinion that the grower and packer are about equally responsible for the decay of citrus fruit in transit. It is believed that this trouble can be largely overcome in 2 ways: 1st, if the growers will avail themselves of the knowledge and practices as to proper fertilization and care now used by the more progressive growers to produce fruit of good carrying quality, and 2nd, if the packer will then intelligently do his part. It is believed that fruit grown on wet soil will generally show much more decay in transit than that grown on rolling well-drained lands; and that decay in transit of "weak fruit" can be greatly reduced by proper fertilization.—*Arthur S. Rhoads.*

647. MONTEMARTINI, LUIGI. Rassegna crittogamica per l'anno 1921. [Cryptogamic review for the year 1921.] Atti Ist. Bot. Univ. Pavia Ser. III, 1: IX-XIX. 1924.—This is the report of the cryptogamic survey for the year 1921 by the director of the sectional observatory and cryptogamic laboratory for the provinces of Pavia, Cremona, Piacenza, and Parma, in Italy. Lists of the fungi and insects injurious to the grape, cereals, forage crops, truck crops, forest trees, and to the fruit, ornamental, flowering, industrial, and other plants of the locality are given, together with preliminary reports on winter and bud sprays of apples, pears and peaches with 2% Bordeaux mixture, 4% solution of polysulphates of Ca and 2% solution of Caffaro powder. The Bordeaux and lime-sulphur sprays were each effective in the control

of *Exoascus deformans* and *Sphaerotheca pannosa* on peach, although lime-sulphur and the solution of Caffaro powder were more effective for the mildew. No control was obtained against *Sclerotinia fructigena*.—P. D. Caldis.

648. MONTEMARTINI, LUIGI. *Rassegna crittogamica per l'anno 1922*. [Cryptogamic review for the year 1922.] Atti Ist. Bot. Univ. Pavia Ser. III, 1: XX-XXXII. 1924.—This is the report of the director of the cryptogamic laboratory of Pavia, Italy. On account of the dry season fungous diseases were not very prevalent. The following, however, were important: *Fusarium Dianthi* on carnations, bacteriosis of celery, *Cercospora Arachidis* var. *macrospora* on leaves of *Arachis hypogaea*, *Oidium* on Cinerarias, rice blast, and *Cuscuta* on alfalfa and clover. A list of the diseases of cultivated, ornamental, forest and pasture plants identified during the year is given.—P. D. Caldis.

649. MONTEMARTINI, LUIGI. *Rassegna crittogamica per l'anno 1923*. [Cryptogamic review for the year 1923.] Atti Ist. Bot. Univ. Pavia Ser. III, 1: XXXIII-XLVII. 1924.—Among the diseases of cultivated plants in the district of Pavia, Italy, which are listed in this paper, the author calls attention to the following as new and serious: (1) Curling of the floral peduncle of greenhouse cyclamen, resulting in malformed flowers. The bulbs of the diseased plants show more or less numerous discolored spots and necrotic areas from which a bacterium was isolated. Bringing the plants into a colder greenhouse (15°C.) checks the disease. (2) Whole rows of young and old cherry trees interplanted with vines already killed by phylloxera in the province of Alessandria, Italy, died suddenly in the course of 1-2 years, as if by a kind of apoplexy. The dead trees show gummosis and root decay accompanied by mycelial growths of unidentified forms. *Polystictus zonatus* Fr. and *Fomes fulvus* Gill. were also found on trunks of killed trees. (3) Eight to ten year old grape vines in the district of Corteggio, Italy, developed normally up to the flowering time when they showed abundant signs of "colatura" (shelling) and later of "millerandage" (shot grapes). At the same time they showed signs of weakening of vegetation followed by an abnormal growth of laterals ("femminile") with shrivelling and twisting of the leaves which were pale green to yellow between the veins. Many berries showed during the latter part of August a black depression called "colpi di pollice" (thumb mark), which is attributed to physiological causes. An unidentified mycelium was observed filling almost all the woody vessels and causing many tyloses. Phenomena of necrosis were observed at places in transverse sections of wood, either localized in spots, or in circular streaks of the spring growth. Varied and numerous reports of experiments with fungicides and insecticides are given and an extensive list of the diseases observed during the year is appended.—P. D. Caldis.

650. NAKATA, KAKUGORO AND SEITO TAKIMOTO. *Studies on ginseng diseases in Korea*. (Japanese; description of new species in English.) Bull. Agric. Exp. Sta. Chosen 5: 1-81. 6 pl. 1922.—The culture of ginseng in Korea is far more extensive than that of all other crops, and forms an important part of Korean agriculture, especially for the government finances, on account of the monopoly. The studies on ginseng diseases in Korea and their control together with those of Japan, have been worked out for 10 years. The results obtained are summarized as follows: (1) The diseases observed in Korea are red rot (*Bacterium araliavorus* Uyeda, leaf blight (*Colletotrichum panacicola* n. sp.), amber-colored rot (*Bacterium Panaxi* n. sp.), sclerotial disease (*Sclerotinia* sp.), leaf spot (*Alternaria Panax* Whetzel), damping-off (*Rhizoctonia Solani* = *Corticium vagum* B. et C.), bending-off (*Phytophthora cactorum* Schrot.), black dry rot (*Phoma panacicola* n. sp.), dry rot (*Cladosporium* sp.), stem rot (*Phoma Panacis* n. sp.), snake-eye disease (*Phyllosticta Panax* n. sp.), soft rot (*Mucor* sp.), and white spot (similar to papery leaf). Among the diseases enumerated, red rot (UYEDA, Bull. Cent. Agric. Exp. Sta., Tokyo 35: 1909), leaf blight and amber-colored rot are most important, because they prevail in all regions of Korea where ginseng is cultivated.—(2) "Leaf blight" differs from "leaf spot" in the felt-like appearance of diseased parts; it attacks leaves, stems and seedlings, causing 50% loss in yield. Sunlight thrown through the chinks of the sun-screen as well as humidity, especially in the rainy season, are favorable to the development of the disease. Spraying is effective for controlling it, Bordeaux mixture being better than lime sulphur.—(3) "Amber-colored rot" causes a rot of roots and stems, and gives them a water-soaked appearance; in advanced stages only vascular fibres of the host remain. It is observed in early spring, and

has been generally overlooked, as it occurs in winter. No effective remedy has yet been found.—(4) Among other diseases “black dry rot,” “stem rot” and “snake-eye disease” are occasionally found. The causal organisms of “sclerotial disease” differ from *Sclerotinia Libertiana* Fuck. in the size, form and mode of formation of sclerotia, and from *S. Panax* Rankin in its growth temperature. Further investigation is under way to study the formation of apothecia.—*Authors. (Courtesy Japanese Jour. Bot.)*

651. NAKATA, KAKUGORO, TOMOSUKE NAKAJIMA, AND SEITO TAKIMOTO. Studies on sugar-beet diseases and their control. (Japanese.) Bull. Agric. Exp. Sta. Chosen 6: 1-118. 8 pl. 1922.—Since 1913 the writers have made special studies on sugar-beet diseases and their control in Korea, and have found 14 kinds, although as regards some of them the actual causes are not yet quite clear.—The diseases which were found are leaf spot (*Cercospora Beticola* Sacc.), snake-eye disease (*Phoma Betae* (Oud.) Frank), sclerotial disease (*Sclerotium Rolfsii* Sacc.), crown gall (*Bacterium tumefaciens* E. F. S. & Towns.), bacterial leaf spot (*Bacterium apatatum* B. & J.), “Momp” disease (*Septobasidium Monpa* (Tanaka) Rac.), stem and root rot (*Corticium vagum* B. & C.), *Alternaria* leaf spot (*Alternaria* sp.), white rot (*Bacterium destructans* Pott.), black heart leaf-spot (probably *Colletotrichum omnivorum* de By.), white hollowed disease (*Rhizoctonia* sp.), bacterial scab (*Bacillus* sp.), and *Physarum* disease (*Physarum cinereum* (Batsch.) Pers.). “Leaf spot,” the most serious disease of sugar-beet, causes 20% loss of yield and 40% loss of sugar content, and prevails in all beet growing regions. The causal organism loses its vitality after 16 months in the laboratory, after 5 months on the surface of the field, and after 8 months in soil under winter conditions in Suwon (southern Korea). Sclerotia-like mycelia embedded in host tissue are much more resistant against cold than spores, and play the chief role in overwintering. Spraying, and especially seed treatment by fungicides are recommended for its control.—The “snake-eye” disease attacking leaves and roots comes next to leaf spot in its damaging action, and breaks out in sandy soil or during dry seasons. The causal organisms are scattered by seed to which they are mechanically adherent, or by other diseased parts where they can maintain their vitality even after having passed through the alimentary canal of cows. Seed-treatment by fungicides as well as by rotation of crops are effective for control. The “stem and root rot” which is destructive not only to sugar-beet but also to all crops, attacks stems and roots, especially root crowns, and causes black rot of leaves, which proceeds from the outside inward. Humidity and covering root crowns with soil favor the growth of the causal organism which may be alive for 6 months in the soil of Suwon. The removal of some soil around the root crown so as to permit access of air is the practical remedy; the sterilization of soil with formalin is also very effective.—All other diseases are of minor importance and found only in special localities. Sclerotial disease is most noticeable in its resistant sclerotium stage, and is found widely spread throughout all regions of Korea.—*Authors. (Courtesy Japanese Jour. Bot.)*

652. [NEWELL, WILMON.] Citrus tree quarantine continued. Citrus Indust. 4¹: 13. 1923.—This is a statement issued by the Plant Commissioner in regard to the public hearing held by the State Plant Board of Florida at Tallahassee, Jan. 8, 1923, to consider the advisability or desirability of amending or continuing in force its Rule 25, which prohibits shipment into Florida of citrus nursery stock. The Board decided to make no change in its present rule, regarding this prohibition as a necessary safeguard against the introduction of numerous serious pests which might otherwise gain entrance to Florida.—*Arthur S. Rhoads.*

653. SHEAR, C. L. Publication of foreign papers. Phytopathology 14: 401-402. 1924.—H. M. Quanjer, Phytopathological Institute of Wageningen, Holland, is to act as European editor for Phytopathology. Papers in English, French or German will be received.—*Adeline Ames.*

654. SMITH, G. E. Fighting pests by telephone. Amer. Fruit Grower 43⁵: 4. 1923.—This is a description of the telephonic spray service in Orleans County in the famous fruit belt of western New York, which is said to save its fruit growers thousands of dollars annually.—*Arthur S. Rhoads.*

655. STEVENS, H. E. The present status of spraying and dusting for control of citrus diseases. Citrus Indust. 4⁶: 8-9, 36. 1923.—(See also Bot. Absts. 13, Entry 7314.)

656. TISDALE, W. B. Report of assistant plant pathologist, investigating tobacco diseases. Florida Agric. Exp. Sta. Ann. Rept. 1922: 68R-75R. Fig. 8-12. 1922.—(1) Diseases occurring in seedbeds: Leaf spot (*Phyllosticta Nicotiana*) causes on the leaves concentric markings with a grayish white center in which dark brown pycnidia develop. It was observed that the older spots break out after they attain a diameter of $\frac{1}{4}$ inch. Other diseases reported are root knot (*Heterodera radiculicola*), root rot (*Thielavia basicola*), wildfire (*Bacterium tabacum*). (2) Diseases in the field: Black shank occurred 1st in Decatur County, Georgia in 1915. Since that time this serious disease very rapidly spread in Gadsden County, Florida. About 10% of the acreage is involved by this disease. It causes typical damping off of young plants, but on plants 8 or more inches high it is more in the nature of a dark colored rot. This black lesion generally girdles the stem and may advance upward for several inches above the surface of the soil. Affected plants wilt very rapidly, generally from the top down; those less severely affected develop small leaves and blossom prematurely. The plants seem equally susceptible at all ages. During or immediately after a rainy period, spots appear on the lower leaves of diseased plants, these spots enlarge very rapidly, sometimes involving the entire leaf. When infected leaves are placed between blotters the spots enlarge within 24 hours to involve the whole leaf. Root knot and wildfire are also discussed.—*J. C. Th. Uphof*.

657. TISDALE, W. B. Report of the tobacco experiment station. Florida Agric. Exp. Sta. Ann. Rept. 1923: 125R-140R. 1923.—The black shank organism (*Phytophthora Nicotianae*) was shown to grow on potato-dextrose agar and oatmeal agar plates at a wide range of temperature. Little growth took place at 10-14°C., but the rate of growth increased up to 35°C. The maximum growth temperature has not been determined. Rate of growth was slower on potato-dextrose agar at all temperatures than on oatmeal agar at corresponding temperatures. It was also slower on +5 and +10 (Fuller scale) potato dextrose agar than when the reaction was neutral. Abundant conidia were produced on both of these media at temperatures between 20-35°C. Growth was rapid on steamed potato plugs, but sporulation was scant. The fungus does not develop in healthy young tobacco plants at 10-14°C. *P. Nicotianae* does not survive in infected tobacco leaves which pass through the ordinary sweating and curing process. The organism persists in the soil for at least 5-6 years after tobacco culture has been discontinued. It became evident that the development of black-shank-resistant strains of Big Cuba tobacco was a promising line of attack. Even in badly infested fields of Big Cuba, the disease rarely makes a clean sweep of any considerable area. Bordeaux mixture (4-4-50) burned the lower leaves of the plants and retarded their growth considerably but did not appear to retard the development of black shank. Root-rot (*Thielavia basicola*) was prevalent on account of cool weather early in the season. Big Cuba suffered a heavy loss. *Phyllosticta* leaf spot (*Phyllosticta Nicotianae*) caused but little damage. It was also found in the field on a small percentage of the lower leaves of Sumatra tobacco growing in the sun, wildfire (*Bacterium tabacum*) was prevalent. Weather conditions were favorable to the disease in most localities throughout the season, and the losses caused considerable alarm. The disease is most serious in sun tobacco and more serious under slat shade than under combination slat and cloth. The disease spreads rapidly from lower to higher leaves early in the season, but more slowly when the weather became warm. In 1 experiment plants were sprayed with 4-4-50 Bordeaux mixture, knapsack sprayers being used. Two other applications of 2-2-50 Bordeaux were applied at 7-day intervals. Little new infection developed during the period of treatment. Continued cloudy and rainy weather set in about a week after the last treatment and prevailed until harvest. The disease spread rapidly during this time and the crop was practically a loss. There was no difference between sprayed and unsprayed rows. Isolation and inoculation experiments proved that wildfire becomes systemic in young tobacco plants, and that such plants become badly etiolated and stunted. Frencing was found in 1 field. It differs from mosaic in that it is not infectious and is thought to be due to the poor physical condition of the soil. Beginning at 3-4 feet above the ground all leaves on the stunted plants were badly mottled and abnormal in shape and size. Margins of the mottled leaves were dead and this condition was more pronounced on each successive leaf until some of the top leaves consisted only of a midrib. The buds of some plants were dead.—*J. C. Th. Uphof*.

658. TURLEY, HAROLD E. Much ado about bacteria. Baking Technology 3: 210-213. 1924.—This is a popular discussion of colored spots caused in bread by bacteria and molds, including *Rhizopus*, *Aspergillus* and *Monilia*. The latter is sometimes mistaken for an intrusion of face powder.—*Carleton R. Ball*.

659. VAILE, R. S. Insects and diseases that attack citrus fruits in southern California. Amer. Fruit Grower. 43²: 24-25, 44. Illus. 1923.—Among the plant troubles, which are not considered as serious or as particularly injurious as are the insect pests, are withertip, brown rot, gummosis, and California scaly bark. They are described and methods are given for their control.—*Arthur S. Rhoads*.

660. WIEDER, F. W. Sulphur quality easily told by simple tests. Citrus Indust. 4⁸: 12, 20. 1923.—The importance of sulphur as an ingredient in fungicides and insecticides is emphasized. The physical properties, including the fuming and free-running qualities, of pure sublimed flowers of sulphur are discussed. Seven simple tests are given enabling growers to tell whether they are getting a good quality of sulphur.—*Arthur S. Rhoads*.

661. WINKLER, HUBERT. Teratologische Notizen. II. Oesterreich. Bot. Zeitschr. 73: 58-60. 1924.

662. WINKLER, HUBERT. Teratologische Notizen. III. Oesterreich. Bot. Zeitschr. 73: 132-146. 1924.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 15, 67, 97, 238, 428, 438, 449, 542, 705, 774, 779, 784, 792, 797, 801, 808, 842, 843, 903, 933, 1013)

663. AZOULAY, L. Nouvel empoisonnement dû aux champignons secs. [Recent poisoning by dried mushrooms.] Bull. Trimest. Soc. Mycol. France 39: 269-271. 1924.—The author states the rules which should be observed in collecting and drying edible mushrooms. Several cases of poisoning demonstrate the need of a rigid control for dried mushrooms.—*S. Blumer*.

664. BADE, E. Poisonous plants of the garden. Sci. Amer. 129: 246. 6 fig. 1923.—This is a popular account.—*Chas. H. Otis*.

665. BAUMAN, LOUIS, MILDRED CHUDNOFF, AND GEORGE M. MACKENZIE. Attempts to separate the active constituent of ragweed pollen. Proc. Soc. Exp. Biol. and Med. 21: 226-227. 1924.—The active substance can be completely extracted from ragweed pollen with 3% NH_3 and can be quantitatively removed from the NH_3 extract by precipitation with acetone. Inference is given that it is in the form of a large molecule. The "globulin" fraction seems to be the more active.—*M. M. Brooks*.

666. BRIDEL, MARC. Sur la véritable nature du glucoside à salicylate de méthyle existant dans l'écorce du *Betula lenta* L. [The true nature of the glucoside of methyl salicylate in the cortex of *Betula lenta*.] Compt. Rend. Acad. Sci. Paris 178: 1310-1312. 1924.—This glucoside was formerly called gaultherine by Schneegans and Gerock (1894), according to the following formula: $\text{C}_{14}\text{H}_{18}\text{O}_8$ (gaultherine) + $\text{H}_2\text{O} \rightarrow \text{C}_8\text{H}_8\text{O}_3$ (methyl salicylate) + $\text{C}_6\text{H}_{12}\text{O}_6$. Upon extracting and analyzing the glucoside it is now found to resemble in all essential respects the monotropitine of *Monotropa Hypopitys*. The author therefore considers it not to be gaultherine.—*C. H. Farr*.

667. CHARAUX, C. Sur le dédoublement biochimique de la rutine. Obtention d'un glucide nouveau, le rutinose. [The biochemical splitting of rutine. The formation of a new glucide, rutinose.] Compt. Rend. Acad. Sci. Paris 178: 1312-1314. 1924.—The constitution of rutine, obtained from *Ruta graveolens* was discovered by Schmidt in 1904. Upon hydrolysis, it was found to break up into quercitine, rhamnose and glucose, thus: $\text{C}_{27}\text{H}_{30}\text{O}_{16} + 2\text{H}_2\text{O} \rightarrow \text{C}_{15}\text{H}_{10}\text{O}_7 + \text{C}_6\text{H}_{12}\text{O}_6 + \text{C}_6\text{H}_{12}\text{O}_6$. It is now found that a sugar may be obtained from

the seeds of *Rhamnus utilis* which represents an intermediate step in this hydrolysis. This sugar, called rutinose, is formed with quercitine by hydrolysis of rutine, and has the composition, $C_{12}H_{22}O_{10}$. Upon hydrolysis, it in turn yields rhamnose and glucose.—*C. H. Farr.*

668. CHAUVIN, E. Sur la toxicité d'*Amanita virosa* Fr. Bull. Trimest. Soc. Mycol. France 39: 222-225. 1924.—The author mentions the structural differences between *Amanita virosa* Fr., *A. verna* Lam., *A. phalloides* Fr. var. *alba* Witt. and *A. citrina* Sch. var. *alba* Price. From the results of injecting a guinea pig and a young cat with extract of *A. virosa*, he concludes that this species is as poisonous as *A. phalloides*.—*S. Blumer.*

669. DANIEL, L. Les plantes médicinales de Bretagne. [The medicinal plants of Brittany.] 64 p., 67 fig. Imprimerie "L'Ouest Eclair": Rennes, 1924.

670. DEARNESS, JOHN. Gyromitra poisoning. Mycologia 16: 199. 1924.—*Gyromitra esculenta* resulted in the death, after 48 hours, of a 16 year old boy.—*G. R. Bisby.*

671. DEUSS, J. J. B. Lead in thee. [Lead in tea.] Thee 4: 27. 1923.—It has been previously demonstrated that no lead occurred in tea even when the lead containers had been white with lead carbonate. Considerable quantities of lead have, nevertheless, recently been reported from Germany, in tea. A sample returned to Java, from thin lead containers which had been broken, showed fragments of the lead mingled with the tea, and even after the visible fragments were removed, chemical analysis revealed the presence of lead. However, an infusion made from this tea proved free from lead.—*Carl Hartley.*

672. DOMBRAY, P., ET M. VLAČOVITCH. Pouvoir bactéricide de l'Ail (*Allium sativum*). [The bactericidal power of garlic (*Allium sativum*).] Compt. Rend. Soc. Biol. 90: 1428-1429. 1924.—By using many kinds of bacteria and an alcoholic extract of garlic the authors demonstrated that the extract had a bactericidal quality which could not be explained by the alcohol present. This bears out clinical experience.—*Oran Raber.*

673. DUKE, W. W., AND O. C. DURHAM. A botanic survey of Kansas City, Missouri, and neighboring rural districts with reference to the flora responsible for hay-fever, asthma and dermatoses. Jour. Amer. Med. Assoc. 82: 939-944. 13 fig. 1924.—The authors state that the greatest producers of light weight pollen in this district are the short ragweed (*Ambrosia elatior*), giant ragweed (*Ambrosia trifida*), marsh elder (*Iva ciliata*), cocklebur (*Xanthium commune*), and lamb's quarters (*Chenopodium album*). The botanic data harmonize closely with the results obtained by specific tests. Of pollen-sensitive patients, by far the greater number were sensitive to the light weight pollens set free in the air in greatest abundance over the longest period of time: 1st to short ragweed, 2nd to giant ragweed, and less often to the others listed above. The spring grasses with their shorter season and smaller ration of pollen production did not compare with the fall weeds in number of cases produced. The authors conclude that, given a patient who inherits a constitution permitting him to become sensitive to pollen, he is most likely to react clinically to the one to which he is most intensely and constantly exposed.—*W. B. Day.*

674. FISHER, N. F., AND EARL B. MCKINLEY. Presence of toxic and insulin-like substances in oranges, grape fruit and lemons. Proc. Soc. Exp. Biol. and Med. 21: 248-249. 1924.—A blood-sugar increasing and a blood-sugar decreasing principle was demonstrated in these fruits.—*M. M. Brooks.*

675. FREUNDLER, P. Sur l'iode dosable des *Laminaria flexicaulis*. [The iodine content of *Laminaria flexicaulis*.] Compt. Rend. Acad. Sci. Paris 178: 515-517. 1924.—The author gives three methods of determining the content of iodine, which is present as mineral iodide, either free or in the form of an imperfect complex. The amount is stated as about 0.65 to 0.75%, and as varying but little from August to December. The amount is independent of the age of the individual plant, and diminishes at the time of sporulation.—*C. H. Farr.*

676. FREUNDLER, P. Variation de l'iode chez les *L. flexicaulis* à l'époque de la repousse annuelle; rôle de la zone stipo-frondale. [Variation in the iodine of *Laminaria flexicaulis* during the annual dormant period; the rôle of the stipo-frondal zone.] Compt. Rend. Acad. Sci. Paris 178: 1625-1628. 1924.—Variations in the total iodine content are influenced by the principal factors which affect diastasic action. Tests were made of the lamina with and without the stipo-frondal zone, which is the region of junction of the stipe and the lamina

and is composed of meristematic cells. The iodine content was found to depend on the media, the age or pigmentation of the tissue and the presence or absence of the stipo-frondal zone.—*C. H. Farr.*

677. GORIS, A. Sur la composition chimique de la Clandestine. [The chemical composition of the clandestine.] *Compt. Rend. Acad. Sci. Paris* 178: 1203-1205. 1924.—*Lathrea clandestina*, a parasitic plant of the forest, has been thought to have the property of rendering sterile women fertile. A study is here made with a view to ascertaining whether or not it has any peculiar chemical composition. The white subterranean portion was analyzed separately from the reddish violet aerial part. Invertin and emulsin were extracted and studied. There was also secured a glucoside analogous to monotropine or to meliatine. Further study is to be made of this substance.—*C. H. Farr.*

678. GROVE, ELLA F., AND ARTHUR F. COCA. The nature of the pollen atopen. *Proc. Soc. Exp. Biol. and Med.* 21: 48. 1923.—Pollen atopen is not a protein but experimental results show that it apparently belongs in the category of enzymes without however demonstrating that the substance possesses the function of an enzyme.—*M. M. Brooks.*

679. KOEHLER, ANDRÉ. Sur une nouvelle méthode d'examen permettant de déceler l'adultération des beurres de cacao. [A new method of examination for the discovery of adulteration in cacao butter.] *Compt. Rend. Acad. Sci. Paris* 178: 940-941. 1924.

680. LELIÈVRE, J., AND Y. MÉNAGER. Dosage simultané de l'iode minéral et organique dans les algues. [The content of mineral and organic iodine simultaneously present in algae.] *Compt. Rend. Acad. Sci. Paris* 178: 1315-1316. 1924.—An attempt is made in the processes of extraction here described to eliminate the loss of iodine either by volatilization or by incomplete destruction of tissue of the alga. It is concluded that in *Laminaria flexicaulis* no volatile organic iodine compounds exist.—*C. H. Farr.*

681. MALLOCK, A. Refractive index of gums. *Nature* 113: 643. 1924.—The author corrects a formula given in a previous article (*Nature* 113: 159), and gives a corrected table for 40 substances.—*O. A. Stevens.*

682. NEEDEHAM, GEO. H. Styrax and its refractive index. *Nature* 113: 785. 1924.—The author claims that the best material is obtained from *Liquidambar orientalis*, native to southwestern Asia Minor. The American styrax (*L. styraciflua*) has been suggested as a substitute. Most samples of the commercial material are adulterated.—*O. A. Stevens.*

683. OLIVIERA, JOSE MARIA DE. A propos de la pharmacologie de quelques substances cardiotropes. Un nouveau toni-cardiaque, la Retama sphaerocarpa Bois. [The pharmacology of some cardiotropic substances. A new heart stimulant, *R. sphaerocarpa* L.] *Compt. Rend. Soc. Biol.* 90: 1089-1091. 3 fig. 1924.—Curves are given to show the action on the heart of this leguminous plant from Portugal.—*Oran Raber.*

684. PALAZZO, F. C. La distillazione del pino mugo in Cadore. [Distillation of *Pinus Mugo* in Cadore.] *L'Alpe*. 2 Ser., 9: 232-240. 1922.

685. PALAZZO, F. C., AND E. ALINARI. Sopra l'utilizzazione dei ginepri. [The utilization of *Juniperus* spp.] *Ann. R. Ist. Superiore Forest. Nazion. Firenze* 61: 143-178. 1920-1921.—The authors discuss the extraction and composition as well as the actual and potential utilization of essential oils and sugars from the berries of *J. communis* L., *J. phoenicea* L. and *J. oxycedrus* L. They include the results of some extractions and analyses.—*Ferdinand W. Haasis.*

686. PASSERINI, N. Sopra l'azione della polvere di "Pyrethrum cinerariaefolium" Trev. sugli insetti e su qualche altro artropodi. [On the action of Pyrethrum powder on insects and some other arthropods.] *Nuovo Gior. Bot. Ital. N.S.* 31: 36-40. 1924.—The author reports in tabulative form, experiments on the effect of pulverized *Pyrethrum cinerariaefolium* grown in Firenze, Italy, on about 200 species of insects and other arthropods. From 2 to over 100 individuals were used in each case. The results are classified as: immediate death, slow death, action uncertain, and no action. It has been inactive for $\frac{1}{3}$ of the Coleoptera species tried, $\frac{1}{7}$ of the Lepidoptera, $\frac{1}{8}$ of the Orthoptera and $\frac{1}{8}$ of the Rhyncites, but active for all Hymenoptera, Diptera and Neuroptera used. It was found to act differently on very closely related species and in some cases affected only 1 of the sexes. Nymphs resist the action of the insecticide better than larvae and larvae better than imagos. Pyrethrum acts on the nervous system producing 1st a superirritation followed by paralysis and death.—*P. D. Caldis.*

687. PERRIN, M., P. DOMBRAY, ET M. VLAČOVITCH. La toxicité expérimentale de l'Ail (*Allium sativum*). [The experimental toxicity of garlic (*A. sativum*).] *Compt. Rend. Soc. Biol.* 90: 1431-1432. 1924.—The method of injection, toxic equivalent, symptoms, etc., are given.—*Oran Raber*.

688. REILLY, JOS. [Rev. of: THURSTON, AZOR. *Pharmaceutical and food analysis: a manual of standard methods for the analysis of oils, fats, and waxes, and substances in which they exist: together with allied products.* xiii + 416 p. Chapman and Hall: London, 1923.] *Nature* 113: 886. 1924.—The reviewer finds the volume lacking in several respects.—*O. A. Stevens*.

689. RHODEHAMEL, H. W., AND E. H. STUART. Atropine sulphate from *Datura Stramonium*. *Jour. Indust. and Eng. Chem.* 13: 218. 1921.—Stramonium contains small amounts of the isomeric alkaloids, atropine and hyoscyamine, the latter being in excess. The hyoscyamine is converted into atropine during the process of extraction and purification, the percentage of total alkaloids varying between 0.15 and 0.60% of the dried stramonium. The small alkaloidal content prevents their commercial extraction by ordinary methods. Tabulations are given of the results of several methods of extraction and purification of the alkaloids from large lots of the drug. The method which apparently gives the best results is, briefly: (1) percolation with water containing 0.2% H_2SO_4 and a preservative, like formaldehyde, sodium bisulphite, cresol or bleaching powder; (2) precipitation of the alkaloids with Lloyd's reagent; (3) recovery of the alkaloid from the precipitate by mixing with H_2O adding NH_3 or lime and extracting with ether or alcohol; (4) purification of the atropine. From $\frac{1}{2}$ to $\frac{3}{4}$ of the total alkaloids were obtained as atropine.—*T. J. Bradley*.

690. TWISS, D. F. Refractive index of India rubber. *Nature* 113: 822. 1924.—The writer used a film of well masticated pale crepe rubber (*Hevea brasiliensis*) and found the index to agree closely with that given (*Nature* 113: 643) for gutta percha. There seems to be no previous record for rubber.—*O. A. Stevens*.

691. WALZER, MATTHEW, AND ELLA F. GROVE. A study of the anaphylactogenic properties of aqueous extracts of pollens and Le Page's glue. *Proc. Soc. Exp. Biol. and Med.* 21: 47-48. 1923.—Pollen extracts are antigenic. LePage's glue has antigenic properties similar to those of pollen extracts. Experiments on guinea-pig uteri make it problematical whether these reactions can be included under the heading of anaphylaxis.—*M. M. Brooks*.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 19, 29, 127, 140, 145, 146, 151, 155, 161, 162, 165, 167, 169, 173, 175, 177, 184, 185, 187, 299, 449, 453, 463, 516, 548, 549, 574, 579, 622, 665, 666, 667, 672, 674, 675, 676, 677, 678, 680, 691, 913, 922, 923, 925, 932)

GENERAL

692. ANONYMOUS. Chemical aspects of plant physiology. [Rev. of: TRIER, GEORG. *Chemie der Pflanzenstoffe* (Chemistry of plant materials). viii + 605 p. Gebrüder Borntraeger: Berlin, 1924.] *Nature* 113: 882-883. 1924.—Two more volumes are projected, dealing with plant metabolism and chemical analysis of the plant. The present volume is complete in itself and comprehensive.—*O. A. Stevens*.

693. BĚLAŘ, K. [Rev. of: PRINGSHEIM, E. G. *Zur Physiologie saprophytischer Flagellaten* (Polytoma, Astasia und Chilomonas). (Physiology of the saprophytic flagellates, Polytoma, Astasia and Chilomonas.) *Beiträge Allg. Bot.* 2: 88-137. 1921 (see Bot. Absts. 13, Entry 7978).] *Arch. Protistenk.* 44: 145-148. 1922.

694. HUTCHINSON, C. M. Report of the Imperial Agricultural Bacteriologist. *Sci. Rept. Agric. Res. Inst. Pusa* 1922-23: 43-52. 1 pl. 1923.—Investigations were conducted on: N fixation in soil by "non-symbiotic" organisms, nitrification, green-manuring, bacterial

decomposition of organic residues, solubilization of mineral phosphates, indigo, and bacterial infection of sugar mills.—N fixation by *Azotobacter* and other soil organisms is increased by the presence of certain soil algae, but not by others. Previous fermentation by organisms from cow dung gave increases in the apparent values of various plants and leaves as sources of energy for *Azotobacter*. N fixation was found to occur in cow dung alone, and was increased by the addition of straw. Small additions of nitrate increased fixation by pure cultures of *Azotobacter*, but larger additions completely inhibited fixation, and the excess nitrate was reduced.—A method has been devised for economical nitrification of cattle urine that can be used by the ordinary Indian cattle owner.—By adding cultures of S-oxidizing bacteria to composts of rock phosphate and S, 66.9–88.9% of the phosphate was rendered soluble within 10 weeks.—A program of work for 1923–24 is appended.—*Winfield Dudgeon*.

695. NICOLAS, G. Revue des travaux de physiologie végétale parus de 1910–1919. [Review of the work in plant physiology, 1910–1919.] Rev. Gén. Bot. 36: 220–240. 1924.

696. PEKLO, JAROSLAV. Základy nauky o výživě rostlin. [Principles of plant nutrition.] 284 p. 2 pl. 74 fig. A. Píša: Brně, 1923.—This book, written primarily for use of students in agricultural colleges, discusses the problems of plant nutrition under the 9 following titles: Intake of mineral nutrients; protoplasm and intake of nutrients, with a subchapter on permeability; enzymes; photosynthesis; circulation of nitrogen in the plant body; symbiosis; respiration in microorganisms; fermentation; and respiration in higher plants. Much space is given to the chemistry of the processes described. Palladin's Physiology is used as a model, and frequent reference is made to his work as well as to the work of other Russian authors.—*M. Demerec*.

PROTOPLASM, MOTILITY

697. BIANCANI, E., AND H. BIANCANI. Action de quelques agents physiques et chimiques sur la mobilité de l'infusoire cilié. [Effects of certain physical and chemical agents on the mobility of infusorial cilia.] Compt. Rend. Acad. Sci. Paris 178: 800–802. 1924.—This is a study of *Paramecium caudatum*.—*C. H. Farr*.

698. DEVAUX, H. L'injection des lacunes, signe de la mort chez les plantes aquatiques. [Injection of the lacunae, a sign of death in aquatic plants.] Rev. Gén. Bot. 36: 99–107. 1924.—The spontaneous injection of the aeriferous spaces in aquatic plants always accompanies death; this injection is localized in the dead region. In healthy living plants the lacunae remain filled with gaseous air even when they are open and in water. This comes about essentially because the surface is wet with difficulty, as if it were waxy; but at the moment of death the surface of a lacuna is modified, becomes wettable and thus provokes injection. This abrupt change is due to the protoplasm which in death contracts and throws off not only water, but also dissolved albuminoid substances which traverse the membrane and become deposited on the surface of the lacuna, rendering it wettable and consequently injectable. Therefore, the injection occurs only in the dead region. The injection of the lacunae reveals thus indirectly a more profound disorganization of the protoplasm than simple coagulation. The dying protoplasm divides into a solid part forming a coagulum, and a fluid part which becomes expelled with the water and diffused therein. This disorganization in all cases begins with death, as is shown by the partial and progressive injection of the lacunae in those plants which suffer from any cause—poisoning, plasmolysis, frost, etc.—*J. C. Gilman*.

DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL RELATIONS

699. ALSBERG, C. L., AND O. S. RASK. On the gelatinization by heat of wheat and maize starch. Proc. Soc. Exp. Biol. and Med. 21: 533. 1924.—Agar preparations were dried in the gel and sol forms, and descriptions of each are given as seen under the polarizing microscope. It is demonstrated that the 2 forms of dried agar have different structures.—*M. M. Brooks*.

700. AMAR, JULES. Coagulation et structure de l'oeuf. [Coagulation and the structure of the egg.] Compt. Rend. Acad. Sci. Paris 178: 803–805. 1924.—This is a physico-chemical study of birds' eggs. It is found that agencies which lower surface tension, such as salts,

alcohols, fats, and heat, provoke coagulation of the egg. It is concluded that life is an operation of more or less slow protoplasmic coagulation, beginning in the egg and continuing throughout life, becoming clearly apparent in old age, and bringing death as an absolute certainty in its irreversible march.—*C. H. Farr.*

701. AMAR, JULES. Coagulation et vie végétale. [Coagulation and plant life.] *Compt. Rend. Acad. Sci. Paris* 178: 1317-1319. 1924.—A study is made of the effect of electrolytes, such as salts and organic acids, and of alcohols, ethers, and oil on starch, the seed of Soissons beans, and the leaves of the European spindle tree. It is concluded that alcohol alone is an energetic coagulant of protoplasm, forming an irreversible coagulum. NaCl and other Na salts counteract this coagulation.—*C. H. Farr.*

702. ANNETT, H. E. Influence of weather conditions on sap and latex flows. *Nature* 113: 821. 1924.—The yield of latex from the opium poppy is greater on cold than on warm nights, and cloudy weather has an adverse effect. The writer studied yield and character of sap in the wild date palm (*Phoenix sylvestris*). A rise in temperature was always followed by a falling off in yield, and conversely. The stem of the tree is rich in starch but no sugar except cane sugar was found. The latter seemed evenly distributed throughout the trunk.—*O. A. Stevens.*

703. BROOKS, MATILDA MOLDENHAUER. The penetration of trivalent and pentavalent arsenic into living and dead cells. *Proc. Soc. Exp. Biol. and Med.* 21: 50-51. 1923.—The biological effects of trivalent and pentavalent As are not the same. Experiments with the marine alga, *Valonia*, showed that more As accumulates in the protoplasm than in the sap or wall. The pentavalent form is taken up in greatest concentration by the protoplasm and in a lower concentration by the sap. When trivalent As is used, much less As is found in the protoplasm and more in the sap. When plants were placed in NaHCO₃ for 1 hour, the sap accumulated free CO₂. This treatment affects the rate of penetration of As into the cell.—*M. M. Brooks.*

704. CAREY, CORNELIA LEE. The relation of acidity to carbon-dioxide adsorption by certain gels and plant tissues. *Physiol. Res.* 2: 407-432. 1923.—This paper reports experiments on adsorption of water and of HCl and citric acid solutions by gels of agar, gelatin, agar-gelatin, and starch, by coconut endosperm, and by dried cotyledons of *Lupinus albus*, *Vicia Faba*, and *Phaseolus lunatus*. Experiments are also reported on the occlusion of CO₂ by agar and gelatin gels, and by agar gel containing either glycocoll, succinic acid, malic acid or sodium stearate; as well as by dried cotyledons of *Lupinus albus* and *Vicia Faba* and pieces of the root of *Daucus Carota* and of the tuber of *Solanum tuberosum*. It appears doubtful that increased acidity in plant tissues would increase the ability of the tissues to hold CO₂.—*B. E. Livingston.*

705. COLIN, H., AND R. FRANQUET. La migration de l'inuline dans les greffes de Composées. [Migration of inulin through grafts in the Compositae.] *Compt. Rend. Acad. Sci. Paris* 178: 518-520. 1924.—Inulin of Jerusalem artichoke as a stock migrates to *Helianthus annuus* used as a scion. A study is made of the migration of inulin, sucrose, and reducing sugars among many grafted Compositae, including: *Helianthus*, *Aster*, *Boltonia*, *Eupatorium*, *Artemisia*, and *Solidago*. The rotation of polarized light is also recorded. A chemical discontinuity in these respects is found between stock and scion. In some cases all of the inulin passes to the scion. If more is injected, it also passes over more or less quickly.—*C. H. Farr.*

706. COSTA CRUZ, J. DA. L'influence du pH sur la lyse par le Bactériophage. [Influence of pH on the lytic action of the bacteriophage.] *Compt. Rend. Soc. Biol.* 90: 878-879. 1924.—In acid solution the bacteriophage flocculates. If the acidity is not too great, this flocculation is reversible. This does not support the vital nature theory of the bacteriophage.—*Oran Raber.*

707. DANIEL, LUCIEN. Migration hivernale de l'inuline des tubercules aériens chez le Topinambour. [Winter migration of the inulin of tubers of the Jerusalem artichoke.] *Compt. Rend. Acad. Sci. Paris* 178: 1205-1207. *Fig. 1-4.* 1924.—In November, 1923, two lots of tubers were secured. From 1 set the aerial tubers were removed and placed in a plot of rather damp gravel. In the 2nd case the aerial tubers were left on the stump of the stem, and the stumps were placed horizontally on the gravel. Some of these were placed so that the

aerial tubers, which are arranged opposite each other on the stem, were in the same plane. In other cases the stump was placed so that one tuber was above the other. In March, 1924, it was found that the isolated tubers had retained their original volume and color, and were at about the same vegetative stage as before. Those which were placed in the gravel on the stumps in 1 plane were also for the most part undeveloped. But in those cases where one tuber lay above the other, the lower one had produced a root system, and showed considerable development. It is thus apparent that the development of aerial tubers of the Jerusalem artichoke in the soil conforms to the law of the level established by Royer. It also seems that stored foods may migrate from 1 tuber to another through the old stem, and thus contribute to the formation of new organs or storage during the winter.—*C. H. Farr.*

708. EFFRONT, JEAN. *Sur le pouvoir absorbant des pulpes végétales.* [The absorbent power of vegetable pulp.] *Compt. Rend. Acad. Sci. Paris* 178: 2032-2035. 1924.—A table is given showing the amount of absorption of CuSO_4 and other salts. The degree of absorption varies from 0.8 to 27.7%. It is concluded that the cell wall contributes not only to the maintenance of a favorable medium, but also to the coordination of the work of the catalysts, which depend on the intermittent absorption of the active substance, of the co-ferment, or of the substances which inhibit the action of the enzyme.—*C. H. Farr.*

709. GIRARD, PIERRE. *Oxydations-réductions conditionnées par des échanges à travers des parois. Rapprochements avec le catalyse.* [Oxidation-reductions conditioned by exchanges across membranes. Relation to catalysis.] *Compt. Rend. Soc. Biol.* 90: 1236-1237. 1924.—The interposition between 2 electrolytes of a membrane differentially permeable to ions, produces chemical processes which differ profoundly from the direct reaction between the constituents of the media. These differ from catalytic phenomena in that they are due to the reestablishment of the electrostatic equilibrium which tends to be destroyed, while in the case of catalysis the cause of the action is still a secret.—*Oran Raber.*

710. GIRARD, PIERRE. *Oxydations-réductions conditionnées par des échanges à travers des parois. Rapprochements avec l'électrolyse.* [Oxidation-reductions conditioned by exchanges across membranes. Relation to electrolysis.] *Compt. Rend. Soc. Biol.* 90: 1238-1239. 1924.—The chief difference between the described phenomena and electrolysis is that in the latter case there is an exterior source of electricity, and the electrons are carried by a metallic conductor instead of by the water. [See also preceding abstract.]—*Oran Raber.*

711. GIRARD, PIERRE, ET MARCEL PLATARD. *Nouveau mécanisme d'oxydation-réduction. Le phénomène de Becquerel.* [A new mechanism of oxidation-reduction. The Becquerel effect.] *Compt. Rend. Soc. Biol.* 90: 932-933. 1924.—The destruction of the electrostatic equilibrium by the selective permeability of the septum in the Becquerel experiment is repaired not by a simple exchange of ions but by the passage of electrons from anions to cations. The compensating mechanism is thus explained as electronic instead of ionic.—*Oran Raber.*

712. GIRARD, PIERRE, ET MARCEL PLATARD. *Nouveau mécanisme d'oxydation-réduction sans l'intervention de catalyseurs.* [A new mechanism of oxidation-reduction without the use of catalysers.] *Compt. Rend. Soc. Biol.* 90: 933-934. 1924.—Two cases similar to the Becquerel phenomenon are reported. The same general explanation applies. [See also preceding and following entries.]—*Oran Raber.*

713. GIRARD, PIERRE, ET MARCEL PLATARD. *Oxydation-réduction sans l'intervention de catalyseur. Remarques sur le mécanisme et ses conséquences chimiques.* [Oxidation-reduction without the intervention of a catalyser. Observation on the mechanism and its chemical consequences.] *Compt. Rend. Soc. Biol.* 90: 1020-1022. 1924.—A 3rd case is reported, followed by a theoretical discussion. [See also preceding and following abstracts.]—*Oran Raber.*

714. GIRARD, PIERRE, AND MARCEL PLATARD. *Sur un nouveau mécanisme de processus d'oxydation-réduction s'apparentant aux processus biochimiques.* [A new mechanism of the process of oxidation-reduction which appears in biochemical processes.] *Compt. Rend. Acad. Sci. Paris* 178: 1212-1215. 1924. [See also preceding and following entries.]

715. GIRARD, PIERRE, AND MARCEL PLATARD. *Sur un nouveau mécanisme d'oxydation-réduction sans catalyseurs.* [A new mechanism of oxidation-reduction without catalysts.] *Compt. Rend. Acad. Sci. Paris* 178: 1393-1395. 1924. [See also preceding entries.]

716. GREEN, ROBERT G. An apparatus for the rapid measurement of surface tension. Jour. Bact. 7: 367-370. 1 pl. 1922.
717. GREEN, R. G., AND H. O. HALVORSON. Surface energy as a controlling factor in agglutination and dispersion. Jour. Infect. Diseases 35: 5-13. 1924.—The conditions associated with agglutination and dispersion of cells are treated mathematically. It is believed that the fundamental force active in agglutination is the distribution of surface energy and not the difference in electrical potential between bacterial cells and the liquid. From the formula $-dE = dS[k_2(e_2 - e_1) - k_1(e - e_0)]$ the distribution of surface energies are expressed as a function of the rate of change of free energy. Substances that depress surface energy of the liquid in the liquid cell interface, favor dispersion; substances that lower the surface energy of the cell favor agglutination.—R. L. Starkey.
718. HARRIS, J. ARTHUR. The tissue fluids of *Cuscuta*. Bull. Torrey Bot. Club 51: 127-131. 1924.—Data on tissue fluids of *Cuscuta*, for plants growing in widely varying environmental conditions, show that "the desert forms have a far higher osmotic concentration of their leaf-tissue fluids than those of moist regions. This result is in accordance with the findings so far published for the osmotic concentrations of the mistletoes. When parasitic on an extreme halophyte, *Allenrolfea occidentalis*, the dodder, *Cuscuta salina*, shows high values of osmotic concentration, specific electrical conductivity, and chloride content, but these are in every instance lower than those demonstrated in the tissue fluids of the host plant. The result is contrary to that generally found for the Lorantheae."—P. A. Munz.
719. LARSON, W. P., AND ROBERT DAVID EVANS. Changes in the surface tension of broth produced by the growth of bacteria. Proc. Soc. Exp. Biol. and Med. 21: 133-134. 1923.—Growth of bacteria is influenced by the surface tension of the culture medium.—M. M. Brooks.
720. LARSON, W. P., AND EDMOND NELSON. The effect of the surface tension of the medium upon bacterial toxins. Proc. Soc. Exp. Biol. and Med. 21: 278. 1924.—Tetanus toxin, diphtheric toxin, botulinus toxin and endotoxin obtained from *Actinomyces gypsoides* were treated with castor oil soap. Botulinus toxin was more resistant to soap than the other toxins which were detoxified.—M. M. Brooks.
721. LAWELLIN, S. J. The value of viscosity tests. Nation. Miller 29: 23-24, 60. 1924.—The author recommends that millers use the viscosity test in selecting wheat, and for determining the quality of flour. The test gives a measure of the gluten, protein, and buffer content of the wheat or flour. It makes possible the standardization of conditions in baking so that they can be maintained and duplicated. Some instructions for making the test are given.—Annie M. Hurd-Karrer.
722. LECOMTE DU NOÛY, P. Dimensions des molécules de certaines substances colloïdales. [Dimensions of the molecules of certain colloidal substances.] Compt. Rend. Acad. Sci. Paris 178: 1102-1104. 1924.—The thickness of the monomolecular layer of rabbit serum is 43.3×10^{-8} cm. The diameter of a molecule of crystallizable albumen is 52.8×10^{-8} . Its dimensions are estimated as $5.2 \times 2.9\mu$.—C. H. Farr.
723. MACDOUGAL, D. T. Growth as a problem in permeability. Carnegie Inst. Washington Year Book 22: 45-46. 1924.—The importance of permeability changes is emphasized. In the growth phase, when its permeability is variable, the plant cell wall is a cellulose gel (insoluble in water) impregnated with water-soluble substances, such as lipins, mannosans, glucosans, and pectins. Pectins accumulate in the outer region of the wall, or in the middle lamella.—B. E. Livingston.
724. MACDOUGAL, D. T. Measurement of changes due to hydration of colloids, to altered permeability, and to growth. Carnegie Inst. Washington Year Book 22: 46-47. 1924.—Studies by means of artificial osmotic cells, with various kinds of colloidal mixtures employed as membranes, are considered.—B. E. Livingston.
725. MACDOUGAL, D. T. Relative effects of common metals in producing contraction, expansion, and plasmolysis of cell-masses. Carnegie Inst. Washington Year Book 22: 49-50. 1924.—Pieces of living *Opuntia* tissue were soaked in water until the resultant rate of swelling declined, when the water was replaced by a salt solution. Auxographic records of subsequent changes in thickness were studied with reference to the nature and concentration of the salt used.—B. E. Livingston.

726. MACDOUGAL, D. T. Relative effects of some common ions on hydration, absorption, and permeability. Carnegie Inst. Washington Year Book 22: 50-51. 1924.—A summary of results is given, suggesting that "the action of the common salts of the soil on plants is in the main determined by the ionic mobility of the particles, with modifications due to the varying composition of the living material and with interferences."—*B. E. Livingston.*

727. McLEAN, F. T. Effect of salt solutions on hydration and swelling of plant tissues. Carnegie Inst. Washington Year Book 22: 47-49. 1924.—Studies are reported on the swelling of stem tips of walnut and blackberry when placed in salt solutions.—*B. E. Livingston.*

728. MACNAMARA, CHAS. The bleeding of cut trees. Nature 113: 858. 1924.—Yellow birch (*Betula lutea*) yields even more sap than sugar maple. The sugar content is low but it was used by the early settlers in Canada to make vinegar.—*O. A. Stevens.*

729. MAIGE, A. Variations du seuil de condensation amylogène avec la turgescence de la cellule. [Variations of the threshold of starch condensation with the turgor of the cell.] Compt. Rend. Soc. Biol. 90: 1415-1416. 1924.—In the hypocotyl of the bean a diminution of turgor, like raising and lowering of temperature, produces a diminution of the "amylogenous excitability" of the cell which results in an elevation of the threshold of starch condensation.—*Oran Raber.*

730. MELLON, RALPH R., W. S. HASTINGS, AND C. ANASTASIA. The role of surface tension and potential difference in the stability of a diphtheria-like bacillus. Proc. Soc. Exp. Biol. and Med. 21: 279-280. 1924.—A highly adhesive and agglutinable strain was emulsified with M/50 sodium oleate, M/16 $MgCl_2$, M/8 sodium citrate, M/2 NaCl, copper acetate and $CaCl_2$. At certain threshold concentrations, surface tension phenomena occurred.—*M. M. Brooks.*

731. MESTREZAT, W., ET M. JANET. La dispersion des colloïdes électrolytiques du protoplasme dans ses rapports avec la nutrition minérale de la cellule. [Dispersion of the electrolytic colloids of the cell in connection with the mineral nutrition of the cell.] Compt. Rend. Acad. Sci. Paris 178: 2281-2283. 1924.—It is shown that the phenomenon of the unequal distribution of electrolytes is directly related to the variable dispersion of the colloid. Cellular exchange is therefore held to be a direct consequence of the fundamental constitution of the organism.—*C. H. Farr.*

732. MESTREZAT, W., ET M. JANET. La dispersion variable des colloïdes électrolytiques dans ses rapports avec les échanges minéraux réalisés entre deux milieux en équilibre dialytique. [The variable dispersion of electrolytic colloids in their relations to the mineral exchanges between two media in a dialytic equilibrium.] Compt. Rend. Soc. Biol. 91: 145-147. 1924.—In the Donnan equilibrium, the unequal distribution of the electrolytes between the 2 media, due to the presence in one of them of an electrolytic colloid, depends not only on the quantity of colloid present but on its state of dispersion.—*Oran Raber.*

733. OSTERHOUT, W. J. V. Continuation of investigations on permeability in cells. Carnegie Inst. Washington Year Book 22: 290. 1924.—Studies are reported on entrance and exit of salts, using *Nitella* as experimental material.—*B. E. Livingston.*

734. PEARSALL, W. H., AND J. H. PRIESTLEY. Meristematic tissues and protein iso-electric points. New Phytol. 22: 185-191. 1923.—When the tissues near an active cork cambium are examined by the use of indicators, the newly formed cork cells are approximately pH 3.0. Within the phellogen, the cortical layers of parenchyma have normally a reaction between pH 5.5 and 6.5. Hence the cambial layer lies across a fairly steep gradient of H-ion concentration. In comparison, the xylem is relatively acid (pH 4.3 to 5.0), while the phloem is alkaline (pH 7.8 or more). The cambium of normal vascular tissues, therefore, also lies across a marked gradient of H-ion concentration, but the gradient runs in a different direction from that in cork cambium. At its iso-electric point a protein will part most readily with its H_2O . A plant meristem requires to be relatively free from H_2O in order to persist in its synthetic metabolism. An essential condition for the production of meristematic activity on this hypothesis is that the most important proteins in tissues capable of growth should have iso-electric points between pH 3 and 6. In the cases investigated, the iso-electric points of the principal proteins lie within the required limits, and are frequently about pH 4.4.—*I. F. Lewis.*

735. SUGDEN, SAMUEL. The determination of surface tension from the maximum pressure in bubbles. Part II. Jour. Chem. Soc. [London] 125: 27-31. 1 fig. 1924.

736. WINSLOW, C. E. A., AND H. J. SHAUGHNESSY. The alkaline isopotential point of the bacterial cell. Preliminary note. Proc. Soc. Exp. Biol. and Med. 21: 437-438. 1924.—Observations show that there is a definite alkaline isopotential point for *Bacillus cereus* at about pH 13.3 to 13.4 and for *Bacterium coli* at about 13.6 to 13.8. Above this point the cells acquire a positive charge.—M. M. Brooks.

WATER RELATIONS

737. BRILLIANT, B. Le teneur en eau dans les feuilles et l'énergie assimilatrice. [The water content and assimilative energy of leaves.] Compt. Rend. Acad. Sci. Paris 178: 2122-2125. 1924.—Several authors have previously found that leaves deprived of H₂O show a reduction in the rate of assimilation. *Hedera helix* and *Impatiens parviflora* are used in this study. A loss of H₂O of 41-63% almost stops photosynthesis. It is at a maximum at 5-15%. Young plants are not so much affected by loss of H₂O as mature ones. There exists an upper limit of desiccation beyond which photosynthesis will not occur.—C. H. Farr.

738. CLEMENTS, F. E., AND J. V. G. LOFTFIELD. The water cycle in plants. Carnegie Inst. Washington Year Book 22: 304-305. 1924.—By means of the plasmolytic method, the daily march of osmotic concentration of the sap in stomatal guard-cells and other epidermal cells was studied, especially with standardized sunflower plants grown at 3 different stations. The 2 kinds of cells exhibited different marches; some details are given.—A study of H₂O-conducting power of stems was made, as related to maximum transpiration rate and leaf area. The basal portion of the stem frequently appeared to determine H₂O conduction. The stems of the standardized sunflower plants showed the following values for hourly conduction per sq. dcm. of leaf area: sun-station, 0.47 cc.; partial-shade station, 0.87 cc.; shade station, 0.43 cc.—B. E. Livingston.

739. IWANOFF, L. A., UND M. THIELMANN. Über den Einfluss des Lichtes verschiedener Wellenlänge auf die Transpiration der Pflanzen. [Effect of light of different wave-lengths on transpiration.] Flora 116: 296-311. 1 fig. 1923.—Experiments were performed on detached leaves, both living and dead, of *Bromus inermis*, *Cyperus alternifolius* and *Libertia formosa*. An arc lamp was the source of light. Color screens were used in most of the experiments, but a spectroscope was used in a few. A thermostat and galvanometer were used to provide for equalizing the amounts of energy from the different rays impinging on the leaves. The leaf or plant was kept on the pan of a pair of balances, and, after an approximate equilibrium was reached, readings were taken at 10, 15 and 30 minute intervals. In the living detached leaves there was an increase in transpiration with a change from red-yellow to blue-violet light, of not less than 17-18%; in pot plants the increase was as high as 50-60%. With dead leaves of *Bromus* and *Cyperus* there was an insignificant change or none at all; but in *Libertia*, the leaves of which become brownish-yellow when killed, there was a slight increase in the blue-violet light.—These results indicate that transpiration is not primarily a response to the heating effect of light rays, but is a physiological process due probably to changes in the permeability of the protoplasm. It is noteworthy that the rays which are most effective in transpiration are also those most effective in growth, phototropism, and phototaxis.—A. G. Stokey.

740. SHREVE, EDITH B. Internal factors governing the seasonal changes in the transpiration of *Encelia farinosa*. Carnegie Inst. Washington Year Book 22: 62. 1924.—Transpiring power of *Encelia* leaves is much less in humid than in dry seasons and the difference cannot be wholly explained by structural differences between the leaves characteristic of the 2 seasons; there must be chemical or solution differences. The transpiring power was found to be inversely proportional to the capacity of the leaf to imbibe water and directly proportional to the initial water content.—B. E. Livingston.

MINERAL NUTRIENTS AND SALT RELATIONS

741. BĚLAŘ, K. [Rev. of: SPEK, J. Der Einfluss der Salze auf die Plasmakolloide von *Actinosphaerium Eichhorni*. (Influence of salts on the plasma colloids of A. Eichhorni.) *Acta zoologica* 2: 153-200. Pl. 1-6. 1921.] *Arch. Protistenk.* 44: 283-284. 1922.

742. BIDAULT, C. Influence de certains cations sur la culture en bouillon de *B. botulinus*. [Effect of certain cations on bouillon cultures of *B. botulinus*.] *Compt. Rend. Soc. Biol.* 90: 1135-1136. 1924.—Using NaCl, KCl, CaCl₂, and MgCl₂, it was determined that the cations used influenced the toxicity of the toxin more than the growth of the organism.—*Oran Raber*.

743. BORESCH, K. [Rev. of: GICKLHORN, J. Studien an Eisenorganismen. I. Mitt. Über die Art der Eisenspeicherung bei *Trachelomonas* und Eisenbakterien. (The type of iron deposits formed by *Trachelomonas* and the iron-bacteria.) *Sitzungsber. Akad. Wiss. Wien. (Math.-Nat. Kl.)* Abt. I. 129: 187-213. 5 fig. 1920 (see Bot. Absts. 11, Entry 783).] *Arch. Protistenk.* 45: 441-442. 1922.

744. FROUIN, A., ET MAYLIS GUILLAUMIE. Influence des sels de fer sur le rendement en poids du *Bacille tuberculeux*. Action de ces sels sur l'utilisation de la glycérine. [Influence of iron salts on the weight production of *B. tuberculosis*. Action of these salts on the use of glycerin.] *Compt. Rend. Soc. Biol.* 90: 831-832. 1924.—The quantity of the organism produced increases with concentration of glycerin, the quantity of glycerin consumed increases with its concentration, and the ratio of quantity of glycerin consumed to weight of bacteria produced also increases.—*Oran Raber*.

745. HOLM, GEORGE E., AND JAMES M. SHERMAN. Salt effects in bacterial growth. I. Preliminary paper. *Jour. Bact.* 6: 511-519. 1921.—It has been shown that the growth of *Bacterium coli* in 1% pepton medium is accelerated or retarded by different salts in low molecular concentrations. The salt effects of various H-ion concentrations vary greatly. Those salts which accelerate growth seem to widen the H-ion range for optimum growth, while those which retard growth seem to narrow the limits for optimum activity. Cations and anions are both effective.—*Author*.

746. HOLM, GEORGE E., AND J. M. SHERMAN. Salt effects in bacterial growth: IV. The physical nature of bacterial growth in various concentrations of neutral salts. *Proc. Soc. Exp. Biol. and Med.* 21: 311-315. 1924.—Bacteria were grown in neutral salt solutions of NaNO₃, NaI, NaCl, Na₂(SO₄)₂ and Na acetate. It was found that in the presence of small amounts of neutral salts, the permeability of the cell is greater than the permeability of the same bacterial cells in plain 1% peptone solution. The authors believe that the rate of growth is closely related to the permeability of the bacterial cell, and that the effect of the salts is an effect upon the organisms themselves rather than upon the physical properties of the media.—*M. M. Brooks*.

747. MENDELEEFF, P. L'influence des ions Ca et des autres ions métalliques sur la croissance des tissus vivants in vitro. [Influence of Ca and other metallic ions on the growth of tissues in vitro.] *Compt. Rend. Soc. Biol.* 90: 985-987. 1924.—Ca ions stimulate cellular growth. Their relation to tumors is discussed.—*Oran Raber*.

748. MOLLIARD. Retentissement de la composition minérale du milieu nutritif sur la structure du *Sterigmatocystis nigra*. [Relation of the mineral composition of the nutritive solution to the structure of *Sterigmatocystis nigra*.] *Compt. Rend. Acad. Sci. Paris* 178: 1865-1867. 1924.—It has previously been shown that chemical changes in the fungus are related to the composition of the media. Two media were prepared having the same amounts of H₂O, sucrose, NH₄NO₃, and KH₂PO₄, but 1 contained the sulphates of Mg, Fe, and Zn, while the other contained the chlorides. Growth was slower in the latter; the mycelium was also flexible, waxy, very thick, and of a mucous consistency. The addition of KH₂PO₄ also changes the structure of the mycelium.—*C. H. Farr*.

749. REED, GUILFORD B. Effects of salt and hydrogen-ion concentration upon the growth and structure of certain bacteria and moulds. [Abstract.] *Phytopathology* 14: 348. 1924.

750. REED, H. S., AND A. R. C. HAAS. The effect of hydroxyl-ion concentration on the growth of walnut roots. *Amer. Jour. Bot.* 11: 78-84. 6 fig. 1924.—Walnut seedlings are sensitive to alkaline conditions, but this harmful effect seems not to be due to high concentration of hydroxyl ions but to Ca starvation following the precipitation of Ca in a highly

alkaline medium. This conclusion is supported by the facts that (1) seedlings may be grown for some time in a solution of a single Ca salt, but perish quickly when kept in a culture solution containing all the necessary nutrients except Ca; (2) when the roots are alternately supplied with a $\text{Ca}(\text{OH})_2$ solution and with a Ca-free solution for 24-hour periods, marked injury is evident during the 2nd exposure to the Ca-free solution; and (3) walnut seedlings have been grown successfully for periods of at least a week in solutions of $\text{Ca}(\text{OH})_2$ (pH 9.0 or somewhat higher) which were renewed continuously during the entire period.—*E. W. Sinnott.*

751. SCHMITZ, HENRY. Studies in wood decay IV. The effect of sodium carbonate, bicarbonate, sulphate, and chlorid on the rate of decay of Douglas fir sawdust induced by *Lenzites saepiarum* Fr. with special reference to the effect of alkaline soils on the rate of decay of wood in contact with them. *Amer. Jour. Bot.* 11: 108-121. 5 fig. 1924.—The amount of decay of sawdust induced by this fungus was measured by the loss of weight of the sawdust in flasks inoculated with the fungus and incubated for 120 days at 28°C. These flasks contained varying concentrations of, respectively, Na_2CO_3 ; NaHCO_3 ; Na_2SO_4 ; NaCl ; Na_2CO_3 and Na_2SO_4 ; Na_2CO_3 and NaCl ; Na_2CO_3 , NaCl and Na_2SO_4 ; and Na_2SO_4 and NaCl . The presence of small amounts of Na_2CO_3 or NaHCO_3 was found to increase the rate of decay, and this stimulation was augmented by the presence of Na_2SO_4 in certain amounts. Whether or not the data indicate that the presence of NaCl augments this stimulation is questionable. It is not clear whether there is an antagonistic action between the various anions. It seems safe to conclude that in certain cases, at least, the average life of wood in contact with alkali soils of certain composition may be shorter than the average life of the same kind of wood in contact with ordinary soils.—*E. W. Sinnott.*

752. SHERMAN, JAMES M., AND GEORGE E. HOLM. Salt effects in bacterial growth. II. The growth of *Bact. coli* in relation to H-ion concentration. *Jour. Bact.* 7: 465-470. 1922.— NaCl in pepton broth has the effect of widening the pH limits in which *Bacterium coli* and *Bact. alkaligenes* grow. Most other neutral salts have the same effect but to a varying degree. A salt such as sodium citrate, which lowers the rate of growth, also narrows the limiting H-ion concentration within which *Bact. coli* will grow.—*C. E. Skinner.*

753. SHERMAN, J[AMES] M., G[EO]RGE E. HOLM, AND W. R. ALBUS. Salt effects in bacterial growth. III. Salt effects in relation to the lag period and velocity of growth. *Jour. Bact.* 7: 583-588. 1922.—It has been shown that the accelerating effect of certain salts upon the growth of *Bacterium coli* is due primarily to an increase in the velocity of growth of the organism during the period of maximum multiplication. The same salts also usually increase the accelerating effect by decreasing the duration of the preliminary latent period.—*Authors' summary.*

754. STOKLASA, JULES. De la fonction physiologique de l'iode dans l'organisme de la betterave à sucre. [Physiological function of iodine in the sugar beet.] *Compt. Rend. Acad. Sci. Paris* 178: 120-122. 1924.—Iodine was found in plants by Chatin (1850), Bourcet (1899), Hendrik and Gouthier (1899), and Winterstein (1919). Bourcet noticed that the Chenopodiaceae and Liliaceae contained more than the Solanaceae or Umbelliferae. Fellenberg found that marine and fresh water plants contain more than terrestrial plants. Sugar beets are found to absorb I from iodides in soil or nutrient solutions. Ordinary soil contains 1 mgm. per kgm. dry weight; 0.005 gm. KI per l. is toxic to grasses in 22 days and to legume in 45 days; 0.006 gm. per l. of KI is not toxic to hydrophytes or hydrophiles, such as *Sphagnum*, *Phragmites*, *Carex*, or *Caltha*. Xerophytes are less sensitive than mesophytes. If 0.02 gm. of KI is added to 12 kgm. of soil in pots, the leaves and roots are found to weigh more, but the sugar content is about the same. Leaves contain 0.9 mgm. of I per kgm. of dry substance; controls contain 0.32. Roots contain 0.6 mgm. as opposed to 0.15 in the controls. *Beta maritima*, however, normally has 1.9 mgm. in leaves and 0.8 in roots. Field experiments confirm these results.—*C. H. Farr.*

PHOTOSYNTHESIS

755. LOCKE, ARTHUR. The reduction of carbon dioxide. *Carnegie Inst. Washington Year Book* 22: 53-54. 1924.—Notes are given on certain chemical studies of the reduction

processes that may take part in the photosynthesis of carbohydrates in green tissues.—*B. E. Livingston.*

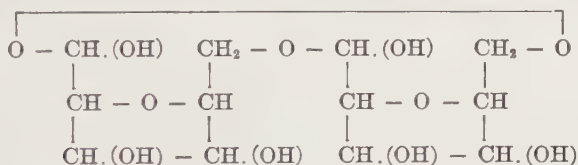
756. SPOEHR, H. A., AND J. M. MCGEE. An improved electrometric method of determining carbon dioxide for photosynthesis investigations. *Carnegie Inst. Washington Year Book* 22: 51-52. 1924.—Improvements are noted, by which 0.002% of CO₂ by volume can be determined.—*B. E. Livingston.*

757. SPOEHR, H. A., AND J. M. MCGEE. The absorption of CO₂ by leaf material. *Carnegie Inst. Washington Year Book* 22: 53. 1924.—Killed leaves are capable of absorbing CO₂ in quantities above the amount that would dissolve in the H₂O of the leaf; this study deals with the nature of the absorbing or adsorbing substances that are involved.—*B. E. Livingston.*

METABOLISM (GENERAL)

758. ANDRÉ, G. Sur la composition des sucs végétaux extraits par pression. [On the composition of vegetable saps extracted by pressure.] *Compt. Rend. Acad. Sci. Paris* 178: 114-116. 1924.—Potato tubers of 2 varieties, *Industry* and *Saucisse*, were used. Tests were made every 2 months during winter storage. The readings give total N, N not coagulated by heat, and N traversing the membrane. The total N increases in amount. The N not coagulated by heat about equals that traversing the membrane. The total N is about 50% more than that coagulated by heat. Extracting with different pressures, namely, 5, 50, and 250 kgm., was tried. For each of these extracts the total P, the mineral P, that is, the P precipitated by Mg, the total N, the ratio of mineral P to total P and of total P to total N is recorded. The former ratio increases with increased pressure, while the latter is not markedly changed.—*C. H. Farr.*

759. BARY, PAUL. La polymérisation de la molécule cellulosique. [Polymerization of the cellulose molecule.] *Compt. Rend. Acad. Sci. Paris* 178: 1159-1160. 1924.—It is concluded that the hydrocelluloses are of the composition, (C₆H₁₀O₅)^m.H₂O; and the oxycelluloses have the composition, (C₆H₁₀O₅)ⁿ.C₆H₁₀O₆. They are polymerized in the following manner:



—*C. H. Farr.*

760. BORESCH, K. [Rev. of: BORESCH, K. Die wasserlöslichen Farbstoffe der Schizophyceen. (The water-soluble coloring matter of the Schizophyceae.) *Biochem. Zeitschr.* 119: 167-214. 1921.] *Arch. Protistenk.* 44: 408-411. 1922.

761. DANIEL, LUCIEN. Coexistence de l'amidon et de l'inuline chez certaines Composées. [The coexistence of starch and inulin in certain Compositae.] *Compt. Rend. Acad. Sci. Paris* 178: 726-728. 1924.—The structures in which this is demonstrated are: the bud scales of *Galanthus* and *Leucojum*, the peduncle and base of the receptacle of the capitulum of *Helianthus tuberosus* and *H. multiflorus* grafted on the annual sunflower, the peduncle and base of the receptacle of *Jurinea alata* and various *Centaureas*.—*C. H. Farr.*

762. DUPONT, GEORGES. Hypothèse sur les relations d'origine entre les terpènes et les acides cristallisés les résines de conifères. [Relations between the origin of the terpenes and of the crystallizable acids in the resin of conifers.] *Compt. Rend. Acad. Sci. Paris* 178: 1560-1562. 1924.

763. GOLINSKI, STANISLAS. Recherches sur les variations du chimisme chez le tomates greffées sur les pommes de terre et sur Lyciet (*Lycium barbarum* L.). [Variations in the chemical composition of tomatoes grafted upon potato and upon *Lycium barbarum*.] *Compt. Rend. Acad. Sci. Paris* 178: 223-225. 1924.—A determination is made of the chemical composition of the scion, and the influence of the perennial stock upon the annual scion is studied. A variety of tomato called "Crostochowskie" was grafted upon 2 varieties of potatoes, Early Rose, and Marjolaine. In both cases the citric acid content and dry weight of the grafted

tomatoes was higher than that of the ungrafted. On *Lycium* the grafted plants have a higher sugar content and slightly more citric acid. The weight is greater than that of controls in pots, but less than that in soil.—C. H. Farr.

764. HUDSON, N. PAUL, AND LELAND W. PARR. Relation of reaction of intestinal contents to diet and flora. Jour. Infect. Diseases 34: 621-624. 1924.—A diet rich in carbohydrates resulted in the development of a simple Gram-positive fecal flora and a distinctly acid reaction; a protein diet led to the development of a mixed Gram-negative flora. The carbohydrate-rich diet led to a more acid condition in the cecum than in the colon.—R. L. Starkey.

765. HUNTER, A., AND G. H. BERKELEY. Metabolism in Botrytis. [Abstract] Phytopathology 14: 349. 1924.

766. JENNY, HANS. Vergleichende Untersuchungen über die Vermehrungsfähigkeit einiger pathogener Bakterien auf den gebräuchlichsten Nahrungsmitteln. [Comparative studies of the multiplication of some pathogenic bacteria on common foods.] Promotionsarbeit von der Eidgenössischen Technischen Hochschule in Zürich. 79 p. Thomas and Hubert: Zürich, 1923.

767. LEMOIGNE. Sur le mécanisme de la production de l'acide β -oxybutyrique par voie biochimique. [On the mechanism of the production of β -oxybutyric acid by biochemical means.] Compt. Rend. Acad. Sci. Paris 178: 1093-1095. 1924.—It is found that in *Bacillus subtilis* there is present a substance which upon hydrolysis gives 1 molecule of α -crotonic acid and 2 molecules of β -oxybutyric acid.—C. H. Farr.

768. LEPESCHKIN, W. The influence of vitamins upon the development of yeasts and molds. (Contribution to the Bios problem.) Amer. Jour. Bot. 11: 164-167. 1 fig. 1924.—Single yeast cells failed to develop in a culture solution containing $(\text{NH}_4)_2\text{SO}_4$ as the source of N. If, however, the culture contained peptone or yeast extract, or if the amount of yeast was great, growth was excellent. Vitamin B added to the culture solution at the rate of 0.001% of crystallized vitamin (melting point 233°C ., molecular weight 511) made possible the growth of single cells. Peptone was found to contain vitamin B. Yeast plants are evidently able to synthesize the vitamin, but single cells apparently cannot begin growth without a supplementary supply of this substance, since it diffuses out too readily into the surrounding solution. In sufficient quantities, the vitamin not only made growth possible but increased its rate, as was shown by growing yeast plants (2 or 3 cells in each culture) without vitamin; and in solutions containing 0.01-0.0001%. Yeast evidently requires but a small quantity of vitamin and fails to respond to larger amounts. Evidence is presented that vitamin stimulates the growth of molds. The effect of the vitamin on growth is probably catalytic.—E. W. Sinnott.

769. MAIGE, A. Excitabilité amylogène et évolution des plastes dans l'embryon du Haricot. [The starch reaction and the development of plastids in the embryo of beans.] Compt. Rend. Acad. Sci. Paris 178: 225-227. 1924.—The threshold of starch condensation, or critical concentration of sugar at which starch is deposited in the plastids, is considered from the point of view of irritability. The observations agree with those of Belzung in that the starch grains appearing in the bean seedling during germination arise by the complete resorption of some of the reserve starch grains. These starch grains are, however, included in the plastids, and not in the vacuoles of the cytoplasm as thought by Belzung. During the synthetic period of seed development, the starch grains fill the cortex and pith of the plumule and radicle; but during the hydrolysis that accompanies maturation and desiccation of the seed, they disappear entirely from the radicle and in part only from the plumule. Starch grains are of 2 types. In the same cell there may exist differences in amylogenic irritability between plastids of the same origin and appearance. Amylogenic activity is less in the pith than in the cortex. Two contiguous cells are often distinct in amylogenic excitability.—C. H. Farr.

770. MAIGE, A. Variations du seuil de condensation amylogène des plastes dans l'hypocotyle du Haricot. [Variations in the threshold of starch condensation in the plastids of the hypocotyl of beans.] Compt. Rend. Acad. Sci. Paris 178: 863-865. 1924.—This is a continuation of the earlier study [see previous entry]. The time and intensity of the condensation reaction seems in some cases entirely independent of the presence or absence of the necessary tonus of excitability.—C. H. Farr.

771. MAIGE, A. Les différents stades de la condensation amylogène. [The different stages of starch condensation.] Compt. Rend. Acad. Sci. Paris 178: 1898-2000. 1924.—In the germination of bean embryos from which the cotyledons had been removed the formation of starch is found to be greater at 20°C. than at 15°C., and greater at 30° than at 20°. During starch condensation, iodine stains the plastids successively yellow, red, and violet. This is taken as evidence of a series of stages in starch formation. *Phaseolus multiflorus*, *Pisum sativum*, and *Faba vulgaris* are also used. It is concluded that: (1) The different stages of starch condensation observed in living cells reproduce in reverse order the steps found in the hydrolytic degradation of starch. (2) Different degrees of condensation, simultaneously, in plastids of the same cell, indicate individual differences in condensation power. (3) These stages of condensation and the persistence in some of the relatively stable red stage is favorable to the hypothesis that there are several catalysts of condensation. (4) This red stage (amyloextrin), which persists in certain species, suggests arrested condensation, a partial amylolytic action, as in sieve tubes and in *Allium Cepa*.—C. H. Farr.

772. MAIHLE, ALPHONSE. Décomposition des extraits chlorophylliens. [The decomposition of chlorophyllian extracts.] Compt. Rend. Acad. Sci. Paris 178: 1988-1990. 1924.

773. MARCHLEWSKI, L. Transformations de la chlorophylle dans l'organisme animal. [Transformation of chlorophyll in the animal organism.] Bull. Soc. Chim. Biol. 6: 464-472. 1924.—The author has isolated from the excrement of cows and sheep fed upon green forage, a crystalline pigment which he names "phyloerythrin" and which differs from the scatocyanine of Schunck, but which is identical with the cholehematin of MacMunn and the bili-purpurin of Libisch and Fischler. That this pigment is derived from the chlorophyll of the food was demonstrated by maintaining a sheep on chlorophyll-free diet for 10 days, during which time the pigment in the bile decreased and disappeared. On resuming the feeding of green forage it again appeared in the bile. The spectroscopic appearance of the pigment is described in detail.—Joseph S. Caldwell.

774. MICHEL-DURAND. De l'état des tannins dans la cellule végétale. [The condition of the tannins in the vegetable cell.] Compt. Rend. Acad. Sci. Paris 178: 586-589. 1924.—A review of the literature is given. Quantitative analysis is made confirming the microchemical researches of others. Young seedlings of oak and chestnut were used. Under the general name of tannins, the true tannins, the flavonolic glucosides, the anthocyanes, etc. are here included. The method of extraction is described. For ungerminated acorns the amount of tannin in 100 gm. of fresh material is given as 0.655-0.740 gm. in acetone, and 2.350-2.223 gm. in water. Per 100 gm. of dry material the figures are 1.200 gm.-1.360 gm. in acetone, and 4.080-4.320 gm. in water. Similar figures are given for various parts of oak seedlings germinated in light and in darkness respectively, and for chestnut germinated in darkness. Tannin is found in the cells in more or less intimate union with the mucilaginous substances.—C. H. Farr.

775. MOLLIARD, M. Influence de la nature des sucres sur la formation des acides organiques par le *Sterigmatocystis nigra* en milieu déséquilibré. [Influence of the nature of the sugars in an unbalanced medium on the formation of organic acids by *S. nigra*.] Compt. Rend. Soc. Biol. 90: 1395-1397. 1924.—With a constant quantity of glucose, an increase of levulose brings about an increase in the gluconic acid produced.—Saccharose is the best nutrient and when it is present, most oxalic and citric acids are produced.—Oran Raber.

776. MOLLIARD, MARIN. Nouvelles recherches sur la formation d'acides organiques par le *Sterigmatocystis nigra* en milieux déséquilibrés. [Formation of organic acids by *Sterigmatocystis nigra* in unbalanced media.] Compt. Rend. Acad. Sci. Paris 178: 41-45. 1924.—A medium was used consisting of H_2O , sucrose, NH_4NO_3 , KH_2PO_4 , $MgSO_4$, $FeSO_4$, and $ZnSO_4$, in definite proportion. These media are represented by the formula: $\Sigma \frac{NH_4NO_3 \cdot M}{1} \cdot \frac{M}{1}$, in which

Σ is sucrose and M the salts other than NH_4NO_3 . This medium was varied as follows:

(1) $2\Sigma \frac{NH_4NO_3 \cdot M}{n}$, and (2) $2\Sigma \frac{NH_4NO_3 \cdot M}{n} \cdot \frac{M}{1}$, in which n may be 5, 10, 25, etc. These media

are indicated as I₅, I₁₀ . . . II₅, II₁₀, . . . Tables of data are given showing results of experiments run for 90 days with weighings at 10-day intervals. Also acidity, citric acid

and gluconic acid contents, and sugar consumed are recorded. The weight of the mycelium in general increases, but in some cases there is a loss after 60 or 70 days, indicating an autolysis of the mycelium. I_{45} gives the highest total acidity of any of that series. Weight of mycelium is always less in II than in I. II produces notably more citric acid and less gluconic acid. Two other series (3) $2\sum \frac{NH_4NO_3}{1} \cdot \frac{M}{25}$, and (4) $2\sum \frac{NH_4NO_3}{1} \cdot \frac{M}{100}$, were also run.

In both of these the weight of mycelium and utilization of sugar was greater than in I. In III there is a feeble production of oxalic and citric acids, but they are abundant in IV. The total acidity of IV is like that of I. Reduction of N provokes the formation of gluconic and citric acids.—C. H. Farr.

777. MORRIS, J. LUCIEN, AND E. E. ECKER. Destruction of uric acid by bacteria and molds. Jour. Infect. Diseases 34: 592-598. 1924.—Uric acid was decomposed by a number of microorganisms among which was *Bacillus acidi-urici* of Ulpiani and several pathogenic molds, *Epidermophyton inguinale*, *Mastigocladium Blochi*, a nail *Blastomyces*, *Achorion violaceum*, and *Sporotrichum Schenkii*.—R. L. Starkey.

778. NODON, ALBERT. Recherches sur la désintégration cellulaire. [Research on cellular disintegration.] Compt. Rend. Acad. Sci. Paris 178: 486-487. 1924.—A special apparatus, described elsewhere, has been developed for very sensitive measurement of the effect of radioactivity on cells of both living and dead organisms. The vegetable radioactivity varies according to the species and the organ of the plant. It is higher for pistils and stamens than for leaves. This radioactivity was found to be 4-5 times higher than that of uranium. Cellular radioactivity undergoes variations analogous to that of radium. There exists a common origin for the disintegration of radium and that of the living cell, attributable to exterior ultra-radiation. These results tend to prove that simple atoms such as H, O, N, and C, which constitute the essential elements of the cell, acquire, under vital action, special physico-mechanical properties, permitting them, under an ultra-radiant influence, to undergo a disintegration analogous to that of atom complexes such as occur in radium. It thus seems that the action of exterior ultra-radiation may play a role in living cells.—The paper is followed by a note by DANIEL BERTHELOT, in which he calls attention to the fact that some years ago he obtained similar results and attributed them as due to humidity and not to radiation.—C. H. Farr.

779. POWELL, WALTER JAMES, AND HENRY WHITTAKER. The chemistry of lignin. Part I. Flax lignin and some derivatives. Jour. Chem. Soc. [London] 125: 357-364. 1924.—A method for isolating pure lignin from flax tissue is described. Derivatives were prepared and information regarding the probable constitutional formula for lignin is given.—F. E. Denny.

780. PRIESTLEY, J. H. The fundamental fat metabolism of the plant. New Phytol. 23: 1-19. 1924.—This is a review of the data bearing on that metabolism of fatty substance which is a fundamental condition associated with growth. A general review of the chemistry of fats and lipins is followed by a discussion of the distribution of fatty substances in the plant, their synthesis at the photosynthetic centers, their formation in the meristem, and the subsequent utilization of fats left behind the apical meristem.—I. F. Lewis.

781. SCHIELD, E. L. The antiscorbutic value of canned vegetables and its preservation by exhausting the air before processing. Proc. Soc. Exp. Biol. and Med. 21: 341. 1924.—Commercial canned corn, beans, or peas contain considerable antiscorbutic vitamin. By removing the air before processing, the antiscorbutic value of the vitamin is doubled or quadrupled.—M. M. Brooks.

782. STANESCU, P. P. Les variations quantitatives de l'amidon dans les feuilles des plantes vertes pendant une journée (24 heures). [Quantitative variations in the starch of leaves of green plants during a 24 hour period.] Compt. Rend. Acad. Sci. Paris 178: 117-119. Fig. A-Q. 1924.—Ursprung found that the maximum amount of starch was present in the chloroplasts after 4-5 hours in direct sunlight; this he interpreted as due to the fatigue of the chloroplasts. The amount of starch in the leaf is here studied at hourly intervals for 24 consecutive hours. Strips were cut from the same leaf at successive hourly intervals; the chlorophyll was extracted and stained with iodine. By comparison of the strips in the

reconstructed leaf, the relative amount of starch in the plastids may be determined. It is found that there is a progressive disappearance of starch during the night from March to July. In August and September, especially, there are 2 maxima during the daytime. In rare cases, there are many maxima, in *Rhus typhina*, 5.—*C. H. Farr*.

783. SUPNIEWSKI, J. Transformation des composés aromatiques sous l'influence du *Bacille pyocyanique*. [Transformation of aromatic compounds by *Bacillus pyocyaneus*.] *Compt. Rend. Soc. Biol.* 90: 1111-1112. 1924.

784. WALLIS, EVERETT S., AND G. H. BURROWS. The composition of soya bean oil. *Jour. Amer. Chem. Soc.* 46: 1949-1953.

785. WORKING, EARL B. Isolation of phosphatides from *Opuntia discata*. *Carnegie Inst. Washington Year Book* 22: 55-56. 1924.—Methods for extracting and isolating phosphatides are discussed.—*B. E. Livingston*.

METABOLISM (NITROGEN RELATIONS)

786. BACH. Variations de la concentration en ions hydrogène sous l'influence de l'assimilation des nitrates par l'*Aspergillus repens* De Bary. [Variation in the concentration of hydrogen ions under the influence of the assimilation of nitrates by *Aspergillus repens*.] *Compt. Rend. Acad. Sci. Paris* 178: 520-522. 1924.—The assimilation of nitrates by a fungus in a sugar solution has the effect of consuming the nitric-ion and liberating the corresponding base. The consumption of sugar, however, often results in production of sufficient acid to counterbalance the alkalinity. The nutrient solutions used in these experiments and the methods employed are described. The pH value was found to increase gradually from 3.6-8.4 during 7 days' growth.—*C. H. Farr*.

787. DILL, D. B. Factors influencing the determination of gluten in wheat flours. *Proc. Soc. Exp. Biol. and Med.* 21: 535-536. 1924.—Uniform results in gluten washing may be obtained by the use of a sodium phosphate buffer solution which is approximately neutral in reaction and which has a concentration of 0.1%.—*M. M. Brooks*.

788. FERNBACH, A., ET SÉBASTIEN NICOLAU. De l'influence de l'azote nitrique sur le fonctionnement de la levure comme ferment alcoolique. [Influence of nitric nitrogen on the action of yeast as an alcoholic ferment.] *Compt. Rend. Soc. Biol.* 90: 1212-1214. 1924.—In an organic medium KNO_3 above 5 gm. per l., favors fermentation but hinders the growth of the yeast. Even when KNO_3 is the only mineral salt present, fermentation is entirely completed.—*Oran Raber*.

789. FERNBACH, A., ET SÉBASTIEN NICOLAU. Influence des nitrates sur la Levure. [The effect of nitrates on yeast.] *Compt. Rend. Soc. Biol.* 91: 8-10. 1924.—Other sources of N than KNO_3 such as NH_4Cl , $(\text{NH}_4)_2\text{SO}_4$, NH_4NO_3 , ammonium phosphate and peptone serve even better as sources of N.—Nitrate acts merely as an accelerator of the zymase. The multiplication of the yeast is hindered. [See previous entry].—*Oran Raber*.

790. GREENBERG, D. M., AND CARL L. A. SCHMIDT. On the mode of union of certain proteins with acids and bases. *Proc. Soc. Exp. Biol. and Med.* 21: 281-284. 1924.—Data for the amount of alkali experimentally found to be taken up by the proteins and figures calculated on the basis of the free dibasic acid groups do not show absolute agreement, but the values are of the same magnitude and indicate a relationship between the alkali combining power of these proteins and their content of free dibasic acid groups.—*M. M. Brooks*.

791. GUITTONNEAU, G. Sur la production de l'urée au cours de l'ammonification par le *Microsiphonées*. [The production of urea during ammonification by the *Microsiphonae*.] *Compt. Rend. Acad. Sci. Paris* 178: 1383-1385. 1924.

792. HALL, H. M. Research on hay-fever: Pacific Coast and Great Basin. *Carnegie Inst. Washington Year Book* 22: 321. 1924.—Through cooperative studies with clinicians and practicing specialists, it seems probable that plants bearing hay-fever pollen may be arranged in groups, any member of which may be used interchangeably with any other of the same group. Both botanical and clinical groupings are at basis chemical. It appears that in some plant families the proteins are very similar, even in different genera, whilst closely related species in other families may differ markedly as to their proteins.—*B. E. Livingston*.

793. LAWELLIN, S. J. Viscosity, protein and gluten. *Nation*. Miller 29⁶: 13-14, 66. 1924. —The author points out the failure to show either quantity or quality of gluten by washing out. The chemical test shows quantity and the baking test helps to indicate quality. The viscosity test by means of the modern torsion viscosimeter is based on the physical principles of colloid chemistry and when standardized it should replace all gluten tests, but protein determinations should be continued to supplement it.—*Carleton R. Ball*.

794. OSBORN, T. B., AND L. B. MENDEL. Continuation and extension of work on vegetable proteins. *Carnegie Inst. Washington Year Book* 22: 340-346. 1924.—It is emphasized that very few of the innumerable substances occurring in plant juice are as yet identifiable. This is a progress report.—*B. E. Livingston*.

795. TELLER, GEORGE L. The chemistry of wheat products. *Nation*. Miller 27: 38-39, 78-79. 1922.—This is a popular account of the chemical composition of wheat.—*Carleton R. Ball*.

796. TRUFFAUT, G., AND N. BEZSSONOFF. Sur le forme de l'azote la plus favorable aux plantes supérieures. [The form of nitrogen most favorable to higher plants.] *Compt. Rend. Acad. Sci. Paris* 178: 723-725. 1924.—White mustard was grown in pots with 14.37 kgm. of soil, pH 7.27, with 1.12 gm. of N per k. and 6.6 gm. of complete fertilizer containing 5% N in different forms. The results for 1920 were as follows: Phosphoric cyanid of urea, 173% (1005% being the control); urea phosphate, 169.4; ammonium phosphate 167.3; Na₂SO₄, 167.3; methylamine 154.4; asparagine, 154. Data for 1921, 1922, and 1923 are given. The mixtures containing uric N show the highest figures as compared with ammonium salts, nitrates, cyanamide, and urea. This is true in both alkaline and acid soils.—*C. H. Farr*.

METABOLISM (ENZYMES, FERMENTATION)

797. BRIDEL, MARC. Application du procédé biochimique de caractérisation du glucose à la recherche de la maltase dans le malt. [Application of the biochemical procedure of glucose characterization to investigation of the maltase in malt.] *Compt. Rend. Acad. Sci. Paris* 178: 1636-1637. 1924.

798. CONN, H. J. A method of detecting rennet production by bacteria. *Jour. Bact.* 7: 447-448. 1922.

799. FLEURY, PAUL. Recherches sur la laccase. I. Méthode d'étude. [Studies of laccase. I. Methods of study.] *Bull. Soc. Chim. Biol.* 6: 436-448. 1924.—The action of laccase upon guaiacol results in the formation of tetraguaiacoquinone, which is precipitated. On redissolving in H₂O it forms a colloidal solution which is coagulated with time or by addition of electrolytes, and is then insoluble in H₂O. This difficulty is avoided by shaking the aqueous solution, after coagulation by addition of BaCl₂, with an equal volume of chloroform, which takes up the coloring matter. It may be estimated colorimetrically in the Duboseq colorimeter using a N/100 solution of I for comparison. The actual yield of guaiacoquinone is never equal to the theoretical, ranging from 72-95%, in presence of an excess of guaiacol, by reason of the formation of colorless H₂O-insoluble guaiacohydroquinone which is not taken up by chloroform. This transformation is slow and can be reduced by a negligible quantity by controlling H-ion concentration, concentration of guaiacol, and time of contact. The laccase remains unaltered and can be recovered at the end of the reaction.—*Joseph S. Caldwell*.

800. FLEURY, PAUL. Recherches sur la laccase. II. Lois d'action de la laccase. [Studies of laccase. II. Laws of action.] *Bull. Soc. Chim. Biol.* 6: 449-463. 4 fig. 1924.—Employing a specially devised apparatus, the author permitted a known quantity of laccase solution to act upon a known quantity of guaiacol for a definite time while a stream of air (entry) the tetraguaiacoquinone produced. The quantity of guaiacoquinone formed is a linear function of the time and quantity of enzyme. The activity of laccase increases with reduction in the amount present, and in every case increases for a time and then slowly falls off. When a small amount of laccase solution previously inactivated by boiling is added, the differences in rate of activity of large and small amounts of laccase disappear. With a constant quantity of laccase, the rate of activity increases in direct proportion to the in-

crease in concentration of guaiacol up to about 1%, becoming independent of concentration with larger amounts. It increases with increase of the O₂ content of the gas mixture present up to 21% of O₂, but shows no increase in rate in pure O₂. The rate of diffusion of O₂ into the liquid medium is the limiting factor. The results are considered as confirmatory of the theory of combination between enzyme and substrate.—*Joseph S. Caldwell.*

801. FLEURY, PAUL. Rapport entre l'activité diastasique et la réaction du milieu: I. Etat actuel du problème. II. Application à l'étude de la laccase. [Relation between enzymic activity and the reaction of the medium. I. Present status of the problem. II. Application to the study of laccase. Bull. Soc. Chim. Biol. 6: 536-592. 4 fig. 1924.—Continuing earlier work (see preceding entries) the author presents a summary of our present knowledge of the effect of such factors as temperature, nature and concentration of the substrate, origin and age of the enzyme, and presence of salts and foreign substances upon the optimum H-ion concentration for enzyme activity. It is shown that there is an optimum pH for action and that it varies with variations in each of the factors named, no matter what the particular enzyme investigated. The various theories proposed by Michaelis, Falk, Van Lier, Van Slyke and Zacharias, and Colin and Chaudun in attempting to account for the existence of an optimum H-ion concentration for activity, are reviewed. None of the theories adequately explain all the known facts. The 2nd part of the paper describes the author's experiments upon laccase. The activity of this enzyme, measured by the amount of action upon guaiacol, shows a definite optimum which is shifted in position by the presence of NaCl or HCN, but which is independent of the amount of laccase present. The variation in activity is directly related to the variations in pH, and is reversible by restoration of the original H-ion concentration. The enzyme is unaltered at the end of the reaction. The activity varies with variations in the concentration of guaiacol, and when the results with amounts of guaiacol ranging from 1.56 to 180 mg. in 100 cc. of the medium at pH concentrations between 4.5 and 9.0 are plotted, the curves representing activity in every case show a change in direction as the optimum pH concentration is exceeded. With 1.56-6.25 mg. of guaiacol, maximum action occurs at pH = 8.4; with 12.5-25 mg., at pH = 7.6; with 50-75 mg., at pH = 7.1; and with 100-180 mg., at pH = 6.7. At pH = 4.5 to 6.7, the amount of guaiacol converted increases with increase in amount of guaiacol up to 100 mg., but is only very slightly increased by larger amounts. At pH = 7.6 the conversion of guaiacol increases with concentration up to 50 mg., then decreases with larger amounts, while at pH = 8.4 the maximum occurs with 25 mg. Varying amounts of O₂ up to 21% influence the rate of action, but this influence is independent of the reaction of the medium. The author considers that the amount of guaiacol converted to tetraguaiacoquinone at a given H-ion concentration is the resultant of 2 effects of the reaction of the medium—an effect upon the rate at which combination of enzyme with substrate occurs, and an effect upon the rate of oxidation of guaiacol. These 2 effects are exerted in opposite directions. The value of the ratio, substrate: enzyme, decreases as the pH value increases (passes to the alkaline side), just as it does when the amount of guaiacol is increased; while it increases with decrease in guaiacol concentration, so that a zone of constancy in amount of action is observed when guaiacol content is decreased and H-ion concentration increased. The rate of oxidation of guaiacol is increased with increase in pH value toward the alkaline side. These 2 opposed effects are believed to be of general occurrence in enzyme action, and the author considers that the occurrence of the "optimum curve" is thereby adequately explained. A bibliography of 132 titles is appended.—*Joseph S. Caldwell.*

802. GIRARD, PIERRE. Schéma de l'activation catalytique par une diastase oxydo-réductrice. [A scheme of catalytic activation by an oxidizing-reducing diastase.] Compt. Rend. Soc. Biol. 90: 1406-1408. 1924.—It is suggested that a catalyst operates by destroying the existing ionic equilibrium which is then repaired by an electronic exchange as in the case reported by Becquerel, and the other cases cited by the author in previous papers. A diastase is then used to show how this scheme would work.—*Oran Raber.*

803. GORTNER, ROSS AIKEN. Observations on the mechanism of the tyrosine-tyrosinase reaction. Proc. Soc. Exp. Biol. and Med. 21: 543-545. 1924.—It is demonstrated that the 2 reactions in the tyrosine-tyrosinase system, that is, the rose-red oxidation and the red-black

oxidation, are caused by independent processes. Certain evidence suggests that the rose color is dependent upon the presence of the phenolic group in tyrosine while the amino group is necessary for the production of the black pigment.—*M. M. Brooks.*

804. GROENEVEGE, J. Untersuchungen über die Zersetzung der Zellulose durch aërobe Bakterien. III. Weitere Untersuchungen über den eigentlichen aëroben sowie über den Denitrifikationsprozess. [Investigations on the destruction of cellulose by aerobic bacteria. III. Further investigations on the true aerobes and on the denitrification process.] Mededeel. Alg. Proefsta. Landb. Dept. Landb., Nijv. Handel (Dutch East Indies) 13: 1-23. 1923.—Cellulose is hydrolyzed by the enzyme cellulase to the disaccharid cellobiose, and then by cellobiase to glucose which is further broken down into acetic, butyric, and lactic acids. In neutral or weakly acid media, the cellobiose is so quickly split that little is present at any one time; in alkaline media the cellobiose is formed faster than it is split, and a spore-forming flora, particularly varieties of *Bacillus cellobiosae*, hydrolyzes the cellobiose into formic acid, acetic acid, and a higher fatty acid, very probably valerianic acid. A secondary flora, partly of spore formers, oxidize the acids to CO₂ and H₂O. Of this secondary flora, the spore formers have not been found to include denitrifiers, while the non spore formers include both nitrifiers and denitrifiers.—*Carl Hartley.*

805. HÉRISSEY, H., AND R. SIBASSIÉ. Recherches biochimiques sur la nature et la quantité des principes hydrolysables par l'invertine et par l'emulsine, contenus dans quelques graines de Légumineuses. [Biochemical studies on the nature and the quantity of hydrolysable principles of invertin and emulsin contained in the seeds of certain legumes.] Compt. Rend. Acad. Sci. Paris 178: 884-886. 1924.—Twenty different species of legumes were used. The study involved the use of polarized light.—*C. H. Farr.*

806. KENDALL, ARTHUR ISAAC, AND REBA CORDELIA HANER. *Micrococcus ovalis*. LXX. Studies in bacterial metabolism. Jour. Infect. Diseases 35: 67-76. 1924.—*Micrococcus ovalis* appears to be a normal inhabitant of the intestine. It belongs to the lactic acid forming and not the putrefactive type.—*R. L. Starkey.*

807. KENDALL, ARTHUR ISAAC, AND REBA CORDELIA HANER. *Bacillus bifidus*. LXXI. Studies in bacterial metabolism. Jour. Infect. Diseases 35: 77-88. 1924.—*Bacillus bifidus* is found in nature only in the alimentary tract. The organism readily ferments many hexose sugars, but is practically inactive on proteins. It exhibits many pleomorphic forms.—*R. L. Starkey.*

808. KENDALL, ARTHUR ISAAC, AND REBA CORDELIA HANER. *Bacillus acidophilus*. LXXII. Studies in bacterial metabolism. Jour. Infect. Diseases 35: 89-104. 1924.—*Bacillus acidophilus* ferments glucose, levulose, mannose, galactose, maltose, lactose, saccharose, and dextrin but not dulcitol. Sorbitol and mannitol were fermented by only 1 of 3 types, all of which are closely related. Proteins were only slightly altered, without the production of aromatic amines.—*R. L. Starkey.*

809. MAIGNON, F. Recherches sur la constitution et le mode d'action des catalyseurs biochimiques ou diastases. Des effets de électrolyse sur les diastases du suc pancréatique et l'amylase de l'orge germée. [Researchs on the constitution and the mode of action of biochemical catalysts such as diastases. The effect of electrolysis on the diastases of the pancreatic juice and the amylase of germinated rice.] Compt. Rend. Acad. Sci. Paris 178: 420-423. 1924.

810. MALFITANO, G., ET M. CATOIRE. La mesure du pouvoir protéolytique de l'*Aspergillus niger*. [Measure of the proteolytic power of *A. niger*.] Compt. Rend. Soc. Biol. 90: 914-915. 1924.—The proteolytic power (*pp*) varies with the method of measurement used to such a degree that exactly opposite results may be obtained; for example, the youngest mycelium has the lowest *pp* in the humid condition but when dry it is the most active.—The *pp* increases considerably in drying, the increase being greater, the younger the mycelium.—Liquid after a contact of only a few minutes with the ground up mycelium is generally more active than that taken from a maceration of several hours.—All figures of *pp* are valuable only for comparison with results obtained by the same method.—*Oran Raber.*

811. NOYES, HELEN MILLER, KANEMATSU SUGIURA, AND K. GEORGE FALK. Studies on enzyme action. 28. The spontaneous increase in the activities of lipase and protease of

tissue extracts. Jour. Amer. Chem. Soc. 46: 1885-1889. 1924.—It has been previously shown that sucrase activity of banana extracts increased, on standing, for a certain period and then decreased again. The results of the present paper show that lipase action increases in the presence of butyric esters. Protease action increased with casein; on gelatin the action was smaller and as a rule showed no change; while the action with peptone decreased with time. "The spontaneous increase in various enzyme actions, including lipase, protease, sucrase, and peroxidase, indicates a common property involving enzyme formation or production in the absence of a life process and only from materials obtained directly from the living matter."—*J. M. Brannon.*

812. SUMNER, JAMES B., VI A. GRAHAM, AND CHARLES V. NOBACK. The purification of jack bean urease. Proc. Soc. Exp. Biol. and Med. 21: 551-552. 1924.—The process for the purification of jack bean urease is given.—*M. M. Brooks.*

813. THOMPSON, WILLIAM P., AND FRANK L. MELENY. A comparative method for testing the enzymes of living hemolytic streptococci. I. Lipase. Proc. Soc. Exp. Biol. and Med. 21: 360-361. 1924.—The velocity of the reaction between certain definite H-ion concentrations was measured by the use of Clark's buffer solutions, with phenol red as indicator. Suspensions of living streptococci were allowed to act upon ethyl butyrate and produce butyric acid. It was found that acid production is more active in young cultures; the optimum temperature is 37.5°C.; the property is destroyed by heating to 60°C. or above for 10 minutes; the optimum H-ion concentration is around pH 7.8.—*M. M. Brooks.*

METABOLISM (RESPIRATION, AERATION)

814. BUSHNELL, L. D. A method for the cultivation of anaerobes. Jour. Bact. 7: 277-281. 1922.

815. BUSHNELL, L. D. Influence of vacuum upon growth of some aerobic spore-bearing bacteria. Jour. Bact. 7: 283-300. 1922.—*Bacillus mesentericus* is less sensitive to the lack of O₂ than most other spore-bearing aerobes, hence its common occurrence in canned foods. Organic acids in the small amounts usually found in foods, greatly influence the thermal death point of *B. mesentericus* and *B. subtilis*, but are not detrimental to growth. Lack of O₂, on the other hand, has no effect on the thermal death point of these organisms but retards growth, particularly of *B. subtilis*.—*C. E. Skinner.*

816. CERIGHELLI, RAOUL. Sur le quotient respiratoire de la racine et ses variations au cours du développement de la plante. [The respiratory quotient of the root, and its variations during development.] Compt. Rend. Acad. Sci. Paris 178: 645-647. 1924.—The author has previously determined the respiratory quotient of the root isolated from the plant. The ratio of CO₂ to O₂ is nearly unity or a little less. He now employs a monometer method described in 1913 by Maquenne and Demoussy. He used wheat, *Helianthus annuus*, white lupine, corn, grey peas, radish, buckwheat, rhubarb, peony, *Plantago major*, sorrel, mint, *Iris germanica*, dahlia, cultivated chicory, and carrot. The data are given in tables. The ratio is found to be always lower than unity at the beginning of development. In annuals low in stored foods it remains less than 1 during growth; in annuals which accumulate reserve food it becomes more than unity.—*C. H. Farr.*

817. CLARK, W. MANSFIELD. Life without oxygen. Jour. Washington [D. C.] Acad. Sci. 14: 123-138. 1924.—Anaerobiosis and aerobiosis are discussed in the light of the present knowledge of chemistry.—*Helen M. Gilkey.*

818. COUPIN, HENRI. Sur la production d'ozone par les végétaux verts. [Production of ozone by green plants.] Compt. Rend. Acad. Sci. Paris 178: 1572-1573. 1924.—It is well known that the air of the country is richer in ozone than that of the city. Ten species of plants were studied and positive evidence was obtained that they are a source of this ozone, and that it is formed only in the light. Negative results were secured with fungi and other plants devoid of chlorophyll.—*C. H. Farr.*

819. FERNBACH, A., ET D. TRIANDAFIL. Sur l'assimilation et l'excrétion de l'azote ammoniacal par la levure. [Assimilation and excretion of ammoniacal nitrogen by yeast. Compt. Rend. Soc. Biol. 90: 912-914. 1924.

820. GOMPEL, MARCEL, ANDRÉ MAYER, AND RENÉ WURMSER. *Recherches sur l'oxydabilité des corps organiques a la température ordinaire.* [Research on the oxidizability of organic bodies at ordinary temperature.] *Compt. Rend. Acad. Sci. Paris* 178: 1025-1027. 1924.—The oxidizability of compounds at ordinary temperatures does not depend alone upon their affinity for O_2 , but also upon other substances present in the life reactions, that is, upon the proper lability of the molecules and the nature of the catalysts. The authors have established a classification of bodies from the point of view of their rate of oxidation in the presence of diverse catalyzers and in diverse conditions of the media. For example, they compare the rates of the following reactions, of which the heat liberated is very much the same: $O_2 + \frac{1}{8} C_6H_{12}O_6 \rightarrow CO_2 + H_2O$, $\Delta F = -127000$ cal.; $O_2 + \frac{1}{8} CH_2O_2 \rightarrow 2CO_2 + 2H_2O$, $\Delta F = -125000$ cal. In this study, various organic acids, glucine, alanine, and glycocoll, are compared as to the amount of CO_2 liberated per hour at the beginning of the reaction at $40^\circ C$. in the presence of C. A study is also reported of the effect of H-ion concentrations of 1, 2, 2.5, 3, 4, 5, 6, 7, and 10 on the rate of oxidation of some of these substances.—*C. H. Farr.*

821. HÉE, A. *L'intensité respiratoire des végétaux obéit-elle à la loi des surfaces?* [Does the intensity of respiration in plants obey the law of surfaces?] *Compt. Rend. Acad. Sci. Paris* 178: 589-591. 1924.—It is shown that there is an entire absence of proportion between the amount of CO_2 liberated and the extent of the surface of leaves. It is therefore concluded that this is not the only condition controlling the process. The law of surfaces applies only to certain animals and is hence not a general biological principle.—*C. H. Farr.*

822. HÉE, A. *Intensité de la respiration chez les végétaux et loi des tailles.* [The intensity of respiration in plants and the law of size.] *Compt. Rend. Acad. Sci. Paris* 178: 1570-1572. 1924.—Measurements are made of the intensity of respiration in entire plants of different sizes. *Brassica Napus*, *Allium Porrum*, *Lupinus albus*, and *Vicia Faba* were used. It has previously been found by the writer that the extent of the surface of leaves bears no relation to the intensity of respiration. It is now shown that neither the fresh weight nor the dry weight is proportional to the intensity of this process.—*C. H. Farr.*

823. LANGDON, SETH C., AND W. R. GALEY. Carbon monoxide a respiration product of *Nereocystis Luetkeana*. *Bot. Gaz.* 70: 230-239. *Fig. 1-3.* 1920. [See *Sci.* 49: 573. 1919 (abst.); and *Jour. Amer. Chem. Soc.* 42: 641-646. 1920.]—The existence of a percentage of CO in the gas contained in the pneumatocyst of the Pacific Coast kelp, *Nereocystis Luetkeana*, is confirmed.—The substance of the kelp when ground and allowed to undergo autolysis and decay does not form CO by enzyme action or fermentation.—Kelp plants, in which the gas normally present within the floater is replaced by air, form several % of CO within a few days.—The formation of CO takes place only when O_2 is present as one of the gases within the floater. No CO is formed when the floater is filled with N or H.—Light does not affect the rate of formation of CO.—The gas obtained from the cavities of various other plants failed to show a similar occurrence of free CO.—The percentage of free CO which occurs in the floater of *Nereocystis Luetkeana* is considered to be a respiration product for the following reasons: It forms only when O_2 is present within the floater; it forms as readily in the dark as in the light; it is not formed by enzyme action or fermentation when the substance of the plant undergoes autolysis and decay; and it is not formed in killed plants.—*From author's summary.*

824. LUTHRA, JAI CHAUD. Some experiments on the effects of dry and moist air on the rate of respiration and breakdown of ripe pears. *New Phytol.* 23: 131-142. 1924.—In experiments with pears (varieties Carteret and Conference) kept in moist and in dry air, the rate of transpiration increases in dry air, and in Conference pears the rate of respiration also. The pears maintain a healthy color and keep better in moist air. The rate of respiration falls off as the pears begin to show breakdown. The specific gravity of the juice is higher in the outer part of the fruit, and in the broken down condition. A difference between the observed depression of the freezing-point and that calculated on the basis of hexose sugars present indicates the presence of acid and of salts.—*I. F. Lewis.*

825. MAYER, ANDRÉ, AND L. PLANTEFOL. *Équilibre des constituants cellulaires et intensité des oxydations de la cellule. Imbibition et oxydation. Cas des plantes reviviscentes.* [The equilibrium of cellular constituents and the intensity of oxidations in the cell. Imbibi-

tion and oxidation during the reviving of plants from desiccation.] Compt. Rend. Acad. Sci. Paris 178: 1385-1388. 1924.—The intensity of oxidation as measured by the exchange of gases between the cell and the external media depends on the rate of oxidation itself and on the rate of diffusion of the gasses. An enquiry is made into the question of whether or not the phenomenon is correlated with the intracellular equilibrium, that is, the property of the fundamental cellular constituents. *Hypnum triquetrum*, a moss, is used. The CO_2 liberated per hour per gm. of moss is determined in cu. cm. for different water contents. It is found that there is an optimum H_2O content which lies between 46 and 60%. With a H_2O content of 24, 40 or 82% the rate of respiration as so measured is usually less. Graphs and tables of data are given.—C. H. Farr.

826. SCHILLER, I. Sur "l'antagonisme provoqué." ["Provoked antagonism."] Compt. Rend. Soc. Biol. 91: 152-153. 1924.—If yeast is grown in a sugar solution which contains no N but instead a growth of *Staphylococcus*, *Streptococcus*, *Pneumococcus*, the cholera vibrio, typhoid bacillus, or paratyphoid bacillus, the yeast will digest the bacteria as a source of N. Such "antagonism" between organisms which are not normally antagonistic is called "provoked antagonism."—Oran Raber.

827. SIERAKOWSKI, S., ET R. ZAJDEL. Sur le rôle du CO_2 dans les cultures bactériennes. [The role of CO_2 in bacterial cultures.] Compt. Rend. Soc. Biol. 90: 1108-1110. 1924.—The $\text{HCO}_3\text{-CO}_2$ equilibrium in cultures of *Bacterium coli* is discussed.—Oran Raber.

828. SIMON, L. J., ET L. PIAUX. Oxydation spontanée des éthers lactiques et de l'alanine en absence ou en presence de catalyseurs. [Spontaneous oxidation of lactic ethers and of alanine in presence or absence of catalyzers.] Bull. Soc. Chim. Biol. 6: 412-423. 1924.—Ethyl, methyl, butyl, and amyl lactates are slowly oxidized when heated to boiling under a reflux condenser in a slow current of air, with the production of the corresponding pyruvate, aldehyde, and CO_2 . In the cold there is no production of pyruvic acid when ethyl lactate is exposed to an atmosphere of O_2 without stirring, but upon mechanically agitating the solution there is a slow absorption of O_2 and formation of pyruvic acid and ethyl aldehyde. In the case of alanine, mechanical agitation of the solution in a stream of O_2 for 45 hours gave neither acetic aldehyde nor pyruvic acid; both were produced when metallic copper and NaOH were added. The production of acetic aldehyde and CO_2 is due to the formation of a less stable tautomer of pyruvic acid, which easily breaks down.—Joseph S. Caldwell.

829. SPOEHR, H. A. Oxidation of glucose by means of air. Carnegie Inst. Washington Year Book 22: 55. 1924.—Chemical studies are reported on glucose oxidation by the O_2 of the air in darkness.—B. E. Livingston.

830. SPOEHR, H. A., AND J. M. MCGEE. Effect of fluctuations in the CO_2 -content of the atmosphere on the rate of respiration of leaves. Carnegie Inst. Washington Year Book 22: 52-53. 1924.—When the CO_2 -content of air surrounding a leaf is increased, the leaf 1st shows a decrease in the rate of CO_2 -emission for a time, and then this rate increases to about the value it had before the change.—B. E. Livingston.

831. SPOEHR, H. A., AND J. M. MCGEE. Studies on plant respiration and photosynthesis. Carnegie Inst. Washington Publ. 325. 4 + 98 p. 27 fig. 1923.—This publication embodies the results of determinations and experiments regarding the fluctuations in amino acid and carbohydrate content of leaves, and the relation of these fluctuations to respiratory activity. The behavior of individual carbohydrates and amino acids is followed by means of experiments. Carbohydrate supply and the supply of free amino acids appear to be the two internal conditions that determine the respiration rate and both are influenced by light. The carbohydrate content of leaves decreases in darkness and increases in light, while the amino acid content increases in darkness. The results presented support the idea that there is a direct relation between respiration and the photosynthesis of carbohydrate in leaves. Photosynthesis requires an acceptor (not simply CO_2), which reacts with the primary product of the light reaction. Conditions that influence photosynthesis appear to act through respiration. It is concluded that the 2 processes are interdependent.—B. E. Livingston.

832. TERROINE, E.-F., R. BONNET, R. JACQUOT, AND G. VINCENT. Rendements énergétiques comparés dans le développement de moisissures aux dépens d'hydrates de carbone ou de protéiques et action dynamique spécifique. [The comparative energy yield during the

development of molds at the expense of carbohydrates of proteins and the specific dynamic action.] Compt. Rend. Acad. Sci. Paris 178: 869-872. 1924.—There is a slight loss of energy in the formation of carbohydrates and more in the formation of fats. The coefficients of utilization of energy of carbohydrates and of proteins are between 100 and 140. *Sterigmatocystis nigra* and *Aspergillus Orhizae* were used. As an example of the results the following is given: Energy of food offered, 3.8223 calories; energy of food left, 2.726 calories; energy of mycelium at end, 0.383 calories; energy of CO₂ liberated, 0.5408 calories; total energy found, 3.6498 calories; difference, or lost energy, 0.1727 calories or 4.5%.—C. H. Farr.

833. TERROINE, E. F., S. TRAUTMANN, R. BONNET, AND R. JACQUOT. Culture de moisissures sur acides aminés et mécanisme de l'action dynamique spécifique. [The culture of molds on amino acids and the mechanism of specific dynamic action.] Compt. Rend. Acad. Sci. Paris 178: 1488-1491. 1924.—All formation of carbohydrates from proteins, as in germination of albuminous seed, and in development of molds on gelatin or pepton, is accompanied by an important loss of energy. The authors and their co-workers have previously shown that the specific dynamic action, that is, the energy lost in the form of heat, by the transformation of proteins into carbohydrates, accounts for the thermogenesis of the homeotherms (Rubner), and that it is entirely unused in the homeotherms for thermic neutrality (Rubner) or by the poikilotherms either animal (Weiss) or plant (Terroine and his co-workers). By growing molds on different amino acids as the sole source of nitrogenous food and the necessary carbon chain, this problem may be studied. If the utilization is identical or nearly so for the different amino acids, then it is evident that the loss of energy operates as in de-amination. If it is different, it must be that it is a consequence of the successive transformation of the carbon chain. Glycocoll, alanine, valine, and leucine were tried with very comparable results, both with *Aspergillus Orhizae* and with *Sterigmatocystis nigra*. It is therefore concluded that it is essentially in the course of de-amination that the loss of energy is produced and that the specific dynamic action of proteins is necessary for de-amination.—C. H. Farr.

ORGANISM AS A WHOLE

834. AYERS, S. HENRY, AND WM. T. JOHNSON, JR. Studies on streptococci. VII. A medium for stock cultures of streptococci and other bacteria. Jour. Bact. 9: 111-114. 1924.—Many organisms cultivated with difficulty on ordinary media grow well in stab cultures on a medium containing the following ingredients: meat infusion; pepton (Parke, Davis), 1%; gelatin (Difco), 1%; casein (pure, prepared according to Hammarsten), 0.5%; glucose, 0.05%; Na₂HPO₄ + 2H₂O (Sorenson's phosphate), 0.4%; NaNO₃, 0.3%; agar 0.75%. Detailed directions for preparing it are given.—C. E. Skinner.

835. BERDNIKOW, A. Limite du développement des microbes dans les milieux artificiels [The limit of development of microorganisms in artificial media.] Compt. Rend. Soc. Biol. 90: 1305-1306. 1 fig. 1924.—The dialysate through a collodion membrane behaves in relation to successive cultures the same as a filtrate obtained with a porous filter. As a general rule, the 1st dialysate will grow a 2nd culture but it is less vigorous. The 2nd and 3rd dialysates will not permit any growth. Yeasts were used in these studies, but the specificity of the phenomenon for yeasts was not determined.—Oran Raber.

836. COHEN, BARNETT. Disinfection studies. The effects of temperature and hydrogen ion concentration upon the viability of *Bact. coli* and *Bact. typhosum* in water. Jour. Bact. 7: 183-230. 1922.—The mortality at constant temperature of bacteria in unbuffered media like distilled H₂O or tap H₂O is variable and coincident with apparently trifling pH variations. Controlling the pH by means of M/500 buffer solutions stabilizes this variability. Subjecting organisms of the colon-typhoid group to mild lethal conditions under moderate temperatures and H-ion concentrations tends to magnify the induction period prior to mortality at the maximum or logarithmic rate. The period of induction is decreased by higher acidity and higher temperature. It appears to have a duration inversely proportional to some exponent of the temperature. It is analogous to the induction period occurring in chemical reactions. At constant pH, the relative resistance of *Bacterium coli* to *Bact. typhosum* decreases with rise in temperature from 0°:10°:20°:30° in the ratio of 67:51:18:8.

At 20°C., *Bact. typhosum* possesses the greatest tolerance within a narrow zone of H-ion concentration delimited by pH 5.0 and 6.4. A slight increase in acidity beyond this zone results in conditions of maximum mortality. For *Bact. coli* the zone is wider and centered about absolute neutrality. The mortality of bacteria whether by strong disinfectants or milder agents follows the laws of logarithmic decline. It is shown that the course of the disinfection process can be expressed by mathematical relations comparable to those used in dealing with monomolecular chemical reactions.—*Author*.

837. CONWAY, JOHN A. Report of outbreak of typhoid fever due to infected ice. *Amer. Jour. Public Health* 14: 574-577. 2 fig. 1924.—“In view of the facts here presented, there seems little doubt that the outbreak of typhoid was directly due to the consumption of the superficial layer of natural ice, harvested from the heavily polluted Chemung River, even though stored, as it was, for a period of from 5 to 6 or possibly 7 months.”—*C. A. Ludwig*.

838. COOK, MELVILLE T. Succession of fungi on culture media. *Amer. Jour. Botany* 11: 94-99. 2 fig. 1924.—On decaying fruits and vegetables there is often a succession of fungous species. The author believes that this is due to successive changes in the character of the food rather than to the formation of toxins which kill or check the organism and make the growth of the succeeding organism possible. A number of species of fungi were grown on (1) Cook's no. II liquid medium; (2) on the same except that another fungus had previously been grown on it; (3) on a medium prepared from the 1st fungus removed from its culture medium; and on varying combinations of (1), (2) and (3). The relative effects were studied by arranging the culture beakers in triangles. The fungi grew readily in either the normal medium or in a medium made from a fungus, regardless of whether the same or a different species was used, but could not grow in the liquid on which the fungus itself had grown. When the 2nd fungus had completed its growth, the beakers with contents were sterilized and the media then inoculated with a 3rd fungus. This, also, grew successfully on the new medium and on the medium made from a fungus, but not on the medium in which another fungus had grown. A medium in which fungi had grown but from which they had been filtered out, and to which new nutrients had been added, was found to support fungous growth successfully, thus indicating that no toxic substances had been produced by the 1st fungus.—*E. W. Sinnott*.

839. DOZIER, CARRIE CASTLE. Inhibitive influence of sugars and salt on viability, growth, and toxin production of *B. botulinus*. XVII. *Jour. Infect. Diseases* 35: 134-155. Charts 1-2. 1924.—Growth was severely retarded in 50% sucrose media and completely inhibited in 55% solution. Toxin production was active in concentrations of sucrose as high as 70%, indicating that the extent of apparent growth is not always an accurate index of toxin production. Eight per cent of NaCl inhibited growth. Toxin production was not consistent in different concentrations of NaCl. Toxin produced in 20% NaCl medium proved fatal to test animals. It is believed that toxin production in the organism is a function of enzyme action. Young cells liberate the toxin under osmotic influences while older cells liberate it only through cell autolysis.—*R. L. Starkey*.

840. DRAPER, A. A. Production of mycelial forms by *Oidium albicans* in carrot infusion. *Jour. Infect. Diseases* 34: 631-635. 1924.—This pathogenic organism developed only in the yeast-form on solid carrot and in media containing malic, malonic, succinic, lactic, or oxalic acids. Typical filamentous forms developed in a medium containing extract of carrot.—*R. L. Starkey*.

841. EYDEN, DORA. Specific gravity as a factor in the vertical distribution of plankton. *Proc. Camb. Phil. Soc. Biol. Sci.* 1: 49-55. Fig. 1-2. 1923.

842. FRED, E. B., AND W. H. PETERSON. The production of pink sauerkraut by yeasts. *Jour. Bact.* 7: 257-269. 1922.—Species of *Torula* are commonly found in sauerkraut, and under certain conditions produce an intense red or pink color, thereby lowering the market value of the product. High NaCl content, O₂ tension, action of aciduric bacteria or the addition of acid, and temperatures above 18-20° favor pigment production. Pure cultures of the organisms produce intense color from non-fermentable sugars such as xylose; while dextrose and maltose have little effect on pigment production.—*C. E. Skinner*.

843. GORINI, COSTANTINO. Studies on the biology of lactic acid bacteria: a summary of personal investigations. *Jour. Bact.* 7: 271-276. 1922.

844. HEIDE, F. F. R. *Biologische onderzoeken bij landbouwgewassen. I. Biologisch waarnemen bij Arachis hypogaea L.* [Biological studies of agricultural plants. I. Biological observations on *Arachis hypogaea* L.] (With English summary.) Mededeel. Alg. Proefsta. Landb. Dept. Landb. Nijv. Handel (Dutch East Indies) 14: 1-19. Fig. 1-3. 1923.—The seed are less sensitive to chemicals than are most European legumes and grasses. The author worked entirely with "Pure line 21" of the Buitenzorg Selection Station [an erect-growing, early-ripening type].—Contrary to the reports of some investigators, cleistogamous flowers are exceptional, and formed only if the light intensity is low. Normal flowers are not visited by insects in the dry monsoon, when many honey-containing flowers are open, but in the wet season are pollinated by a number of different insects. Consequently pure lines can be kept pure by growing them in the East Monsoon. Contrary to von der Wolk's report, fertilized gynophores may develop to maturity without contact with soil or soil-extract, if the plant which bears them has none of its gynophores in the soil. The ripening fruits are capable of absorbing water from the soil, but they absorb in large quantity only if the root system is put out of action.—*Carl Hartley.*

845. KEENER, ALICE E. A study of the factors concerned in the reddening of leaves of *Diervilla lonicera*. *Amer. Jour. Bot.* 11: 61-77. 1 pl., 3 fig. 1924.—Red leaves are thicker than green ones and possess 2 layers of palisade cells. Sunlight, kind of soil, H₂O-content of soil, and rate of transpiration were found to be concerned in this reddening. Leaves tend to redden in sunshine but to remain green under shade. Red plants, if artificially shaded, become almost entirely green. Poor or dry soil tends to produce reddening even in shade, though these factors are not as strong as sunlight. Transfer of red plants to richer or to moister soil reduces the reddening. Under the same conditions, transpiration is ordinarily higher in red than in green plants. In red leaves the stomata tend to remain open; in green ones, closed. The H-ion concentration of soil at the root level of both red and green plants ranges from pH 5.6 to pH 6.2.—*E. W. Sinnott.*

846. KOSER, STEWART A. Differential tests for colon-aerogenes group in relation to sanitary quality of water. *Jour. Infect. Diseases* 35: 14-22. 1924.—Organisms of the colon-aerogenes group obtained from polluted streams and from H₂O of high sanitary quality were tested by the methylene red test, the Voges-Proskauer reaction, and by development in uric acid and in citrate media. Results from the 1st 3 tests failed to correlate with the known sanitary condition of the water. According to the citrate test, organisms of the *B. coli* type comprised 64.5% of the color organisms from polluted H₂O and 16.7% of those from H₂O of high sanitary quality. It is believed that the use of the citrate test should prove valuable in sanitary water analysis.—*R. L. Starkey.*

847. LEWIS, FRANCIS J., AND GWYNETH M. TUTTLE. On the phenomena attending seasonal changes in the organization in leaf cells of *Picea canadensis* (Mill.) B. S. P. *New Phytol.* 22: 225-232. 1923.—Data are given showing changes in osmotic pressures, electrical conductivities, and viscosities of the sap, and in the conditions of the leaf cells of *Picea* during late winter, 1919-1920, in Northern Alberta, Canada. A rapid drop is noted in the osmotic pressure from the winter level of over 20 atmospheres to 16 or 17 atmospheres at the date when the leaf cells pass from the winter to the summer condition (toward the end of April). Starch 1st appeared on April 5, 1920, after a period of 6 days during which the maximum temperature remained below 32°F. and minimum temperatures of 14°F. were experienced. Material of other conifers from an elevation of 6500 feet in the Rocky Mountains shows conversion at approximately the same date as that from the Edmonton district at 2240 feet, where spring is at least 6 weeks earlier. Reorganization of the chloroplast, migration of the chloroplast from the nucleus, changes in the chemistry of the pigments, and the 1st appearance of starch take place in darkness as well as in light.—*I. F. Lewis.*

848. MELENEY, FRANK L., AND ZUNG-DAU ZAU. The viability of hemolytic streptococcus in certain solutions containing gelatin. *Proc. Soc. Exp. Biol. and Med.* 21: 259-261. 1924.—Various culture solutions for maintaining the life of this organism are given. Gelatine citrate, Locke's "20-1," Zeug's mixture, distilled water and "normal" saline were efficient in the order named.—*M. M. Brooks.*

849. MOLLIARD, MARIN. Manière dont se comporte le *Sterigmatocystis nigra* vis-à-vis de diverses substances sucrées dans des milieux faiblement minéralisés. [The behavior of

Sterigmatocystis nigra in the presence of different sugars in media weak minerals.] *Compt. Rend. Acad. Sci. Paris* 178: 161-163. 1924.—Determination is made of the maximum amount of glucose which can be transformed in the presence of certain amounts of N, and of mineral substances. If the fungus is given 14, 21, 28, or 35 gm. of sugar per 150 cc. of nutrient liquid, there develop within 10 days at 36° acidities represented respectively by 35.5, 55.8, 56, and 57.2 cc. of the normal solution; but the theoretical maximum acidity which corresponds to the total transformation of glucose into gluconic acid amounts to 38.8, 58.2, 77.6, and 97 cc., respectively. The organic acid content does not pass a value of 56 cc. per 150 cc., and all of the glucose is transformed in only the 1st 2 media. With different substances the acidity expressed in cc. of the normal solution, is found to be as follows: maltose, 2; lactose, 0; glucose, 4; levulose, 1.2; galactose, 0.6; arabinose, 0.4; mannite, 0.15; glycerine, 0.5. The acidity is also given for glucose and levulose in varying proportions. It is concluded that the formation of gluconic acid is the result of the reduction of mineral substances, and is dependent upon the presence of levulose.—*C. H. Farr.*

850. MUELLER, J. HOWARD. Studies on the cultural requirements of bacteria. I. *Jour. Bact.* 7: 309-324. 1922.

851. MUELLER, J. HOWARD. Studies on the cultural requirements of bacteria. II. *Jour. Bact.* 7: 325-338. 1922.—Peptone-free beef heart infusion plus glucose and inorganic salts constitutes a satisfactory medium for the hemolytic streptococcus. Short boiling of heart infusion with 2% wood charcoal ("Norit") removes some component of the meat infusion and renders it no longer suitable for this streptococcus. Such an inactive infusion may be reactivated by the addition of small quantities of peptone or acid hydrolysate of certain proteins, such as casein or edestin. Acid hydrolysates of such proteins as wool, silk, and wheat gluten are not suitable for reactivation. The activating material may be precipitated from hydrolysates of casein by means of HgSO_4 . It may be separated into 2 fractions, active only when mixed together, by means of fractional precipitation of the 1st HgSO_4 precipitate by HgSO_4 , or precipitation by Ag_2SO_4 and baryta. So far as has been learned, known amino acids will function in place of neither of these fractions. The Ag_2SO_4 precipitate, or X fraction, does not depend for its activity on the pigment. It escapes precipitation by phosphotungstic acid under certain conditions, but is readily destroyed by this reagent. The Ag_2SO_4 filtrate, or Y fraction, contains a considerable quantity of a new S-containing amino acid, the relation of which to the active Y has not been demonstrated.—*Author's summary.*

852. PAPACOSTAS, G., ET J. GATÉ. Recherches expérimentales sur les associations microbiennes, Bacille diphtérique et *Micrococcus tetragenus*. [The microbial association of the diphtheria bacillus and *M. tetragenus*.] *Compt. Rend. Soc. Biol.* 90: 1257-1259. 1924.—The association in vitro of *Micrococcus tetragenus* with Loeffler's bacillus has no effect upon the growth of the latter, stimulating or otherwise.—The toxin produced by the bacillus under this association is neither stronger nor weaker.—Neither in vivo does the micrococcus have any effect upon the diptheria bacillus.—Inversely the bacillus does not influence the micrococcus in vivo, though it may favor the passage of the latter into the blood without, however, increasing its virulence. The clinical importance of the association of these 2 organisms assumed by many authors, finds no confirmation in these experiments.—*Oran Raber.*

853. PORTER, CHARLES LYMAN. Concerning the characters of certain fungi as exhibited by the growth in the presence of other fungi. *Amer. Jour. Bot.* 11: 168-188. 3 pl., 9 fig. 1924.—Various inhibitions exerted by fungi upon one another were studied in a large number of species. Five types are recognized: (1) the mycelium of both mutually intermingling; (2) one organism growing superficially over the other, which is greatly inhibited; (3) slight inhibition, both organisms inhibited but approaching each other until almost in contact when growth ceases; (4) one organism growing around the other; (5) organisms inhibiting each others' growth at a considerable distance. Inhibition of growth may modify the character of the colony and produce various morphological changes in the organism. The richer the medium in nutrients, the less marked were the inhibitions. The inhibitions varied but slightly with changes in the amount of inoculum, in time of inoculation, or in depth of medium. A common cause of the inhibitory action was found to lie in the presence of some product formed during growth. The types of inhibition characteristic of the main groups of fungi

are described. The inhibiting qualities of a fungus may aid in its identification. *Helminthosporium* is a strong inhibitor and its presence measurably protects seedlings from infection by other fungi. Roots of seedlings and root hairs gave no tropic response in the presence of fungi.—*E. W. Sinnott.*

854. SHREVE, FOREST. Stem analysis of Monterey pine and redwood. Carnegie Inst. Washington Year Book 22: 44-45. 1924.—Studies of annual growth rings as related to climatic conditions. There is evidence that rainfall is more important than temperature in the growth of young trees and that temperature is more important than rainfall for mature trees.—*B. E. Livingston.*

855. SKINNER, CHARLES EDWARD, AND T. J. MURRAY. Medium for inhibition of spreaders and differentiation of *B. coli* and *B. aerogenes*. Jour. Infect. Diseases 34: 585-591. 1924.—The addition of crystal violet in concentration of 1 to 100,000 to the American Public Health Association standard eosin methylene blue agar, is recommended for the identification of *B. coli* and *B. aerogenes* in sanitary analysis. Colonies of the 2 organisms are readily differentiated by their typical appearance. The development of spreading colonies is inhibited. *B. aerogenes* was found to predominate in soil and *B. coli* in feces.—*R. L. Starkey.*

GROWTH, DEVELOPMENT, REPRODUCTION

856. CANNON, W. A. Experimental investigations on roots. Carnegie Inst. Washington Year Book 22: 56-62. 1924.—Studies on root growth in relation to different low O₂ pressures in the soil atmosphere and to different soil temperatures are considered. Experimental results with roots of *Potentilla*, *Zea*, *Opuntia*, *Prosopis*, *Allium*, *Salix*, etc., are summarized. For any maintained temperature, a growth ratio or growth index is derived by dividing the growth rate with diminished O₂ supply by the corresponding rate with O₂ supply adequate for maximum growth at the given temperature. While different plant forms differ in regard to the magnitudes of their growth ratios, yet these values are generally progressively smaller with higher soil temperatures, within the temperature range studied. For example, with a temperature of 17°C. the ratio value is unity for *Potentilla* when the soil air contains 2% O₂, and for *Zea* when the soil contains 10% O₂. A relatively great tolerance of low rates of O₂ supply to the roots is suggested for *Potentilla* and *Salix*, as contrasted with a relatively low tolerance in the case of *Zea* and *Allium*. Some features of experimental methods receive attention.—*B. E. Livingston.*

857. CHAMBERS, WILLIAM H. Cultures of plant cells. Proc. Soc. Exp. Biol. and Med. 21: 71-72. 1923.—Migration of plant cells takes place from small pieces of tissue, whereas large pieces remain together and grow to form organized tissue. In animals the rate of cell migration and growth is related to the size of the fragment.—*M. M. Brooks.*

858. MACDOUGAL, D. T. Dendrographic measurements [of growth]. Carnegie Inst. Washington Publ. 350. P. 1-88. 18 fig. 1924.—The author's studies on tree growth, including dendrographic records for nearly 100 tree years, form the basis for additional conclusions on the course and mechanism of growth. Much of the work deals with the Monterey pine (*Pinus radiata*). Records and observations are given for other plants also, as follows: Arizona pine (*P. arizonica*), Mexican pine (*P. strobiformis*), yellow pine (*P. scopulorum*), redwood (*Sequoia sempervirens*), Arizona walnut (*Juglans major*), Arizona ash (*Fraxinus arizonica*), palo verde (*Parkinsonia microphylla*), bagote (*P. aculeata*), sycamore (*Platanus occidentalis*), Carolina poplar (*Populus deltoidea*), MacDougal's poplar (*P. Macdougalii*), willow (*Salix lasiolepis*), and sahuaro (*Carnegiea gigantea*). Some detailed studies are reported on volume changes in potato tubers (*Solanum tuberosum*) during their development and on enlargement in the squash (*Cucurbita pepo*) fruit.—In the Monterey pine, root tips and shoot terminals begin to elongate each year before any cambium activity is discernible. Young specimens of this pine have been observed to show some enlargement in every week of the year, but with several brief intermissions related to drouth or low temperature. Secondary thickening of large roots does not begin until after the beginning of enlargement in the trunk. The terminal shoots of the Arizona pine and the Mexican pine, on the mountains near Tucson, Arizona, begin to enlarge in the spring before the awakening of the cambium. The growing season for these trees does not extend beyond 3 months.—For leaves, stems, tubers, roots and fruits, daily fluctuating variations in volume, are shown to be determined

by the transpiration rate. The effects of defoliation, girdling, etc., of pine trees are discussed.—D. T. MacDougal.

859. MACDOUGAL, D. T. Dendrographic records of growth in trees. Carnegie Inst. Washington Year Book 22: 43-44. 1924.—Notes on daily and seasonal changes in a Monterey pine tree are given.—B. E. Livingston.

860. SHREVE, FORREST. The growth record in trees. Carnegie Inst. Washington Publ. 350. P. 89-116, 10 fig. 1924.—Out of 125 Monterey pines (*pinus radiata*) examined, the 2 most rapidly growing ones had made an average annual diameter-increment of 6 mm. The greatest observed growth in a single year was 3.6 cm. The age-diameter curve is nearly a straight line, being the same for trees on sand and on heavy clay. In young trees 100-200 cm. in height, from 40-50% of the annual height growth occurs before the end of March. In young trees 4.5 to 6 m. in height there is no correlation between growth in height and in diameter.—Trunks of Monterey pine and redwood (*Sequoia sempervirens*) cross-sectioned at intervals of 1 m. show that the annual march of growth is not the same at different heights in the trunk. Correlations are reported between rate of growth and amounts of annual and seasonal rainfall, the growth data used being from the stump section and from the average of the 10 lowest 1-meter sections. The rainfall data used are totals for the year and for the following periods: Jan. to Aug., Feb. to Sept., Mar. to Aug., and Dec. to Sept. A negative correlation between growth and annual rainfall is indicated. Stump data show no correlation with Dec.-Sept. rainfall, and the average data from the trunk show a negative correlation with the rainfall of Dec.-Sept. The correlation of growth to annual rainfall is the same for pine and redwood, but that of growth to the rainfall of the growing season is stronger for the redwood. Other data are presented and discussed. The results confirm our knowledge of the dependence of growth on the entire constellation of environmental conditions, and indicate that the annual march of growth is not correlated with the march of any individual conditions.—F. Shreve.

861. SMITH, J. HENDERSON. On the early growth rate of the individual fungus hypha. New Phytol. 23: 65-78. 1924.—The fungal hypha elongates at the tip only. In *Botrytis* hyphae the rate of elongation steadily increases, reaching eventually a maximum at which it remains constant for a time. Considerable individual variations occur. The parts of the hypha behind the tip contribute to its activity. The rate of extension of the individual hypha, relatively to its length, falls off continuously as it elongates. Branches behave like the main hypha. If the whole hyphal system be taken as a unit, the rate of growth remains approximately constant for hours. A tentative explanation is offered for these rate relationships and the origin of branches. No evidence has been found of any increase in true growth rate nor of the formation of any substance accelerating growth.—I. F. Lewis.

862. SUMMERS, F. The factors governing bud formation: a chapter of plant physiology. New Phytol. 23: 20-49, 78-102, 113-131. 1924.—A summary of the progress made by physiologists is given in 10 chapters, as follows: (1) The sap concentration factor, (2) the work of Loeb on *Bryophyllum*, (3) the Loeb effect in fruit trees, (4) evidence favoring the Loeb inhibition hypothesis, (5) evidence against this hypothesis, (6) seasonal variations in the food reserves of the shoot, the carbohydrate: nitrogen ratio, (7) the problem of fruit bud formation, (8) the resting period, (9) the ringing of woody shoots, and (10) summary and conclusions.—I. F. Lewis.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

863. ALLEN, W. De l'influence du gaz carbonique sur le géotropisme. [Effect of CO₂ on geotropism.] Compt. Rend. Soc. Biol. 90: 1447-1448. 1924.—It is reasoned that if Small's theory of geotropism is correct, placing the roots in an atmosphere free from CO₂ and the shoot in an atmosphere rich in CO₂ should result in the reversal of the normal geotropic action. Such an experiment is described with lupine. Aside from a slight retardation of growth the plant grew normally. It is concluded that Small's theory rests on an insecure foundation.—Oran Raber.

864. CHAPMAN, R. E., W. R. I. COOK, AND N. L. THOMPSON. The effect of carbon dioxide on the tropic reactions of *Helianthus* stems. New Phytol. 23: 50-62. Pl. 1, fig. 1-4. 1924.—Normal seedlings of *Helianthus annuus* grown in concentrations of CO₂ up to 40-45% show nor-

mal geotropic and heliotropic response; etiolated seedlings show normal geotropic response. In CO₂ above 40–45%, growth and all response cease. The preliminary downward curvature of etiolated seedlings in CO₂ is due to mechanical stress and not to a reversal of geotropism. In the higher concentrations of CO₂ the geotropic response usually precedes the heliotropic response. The stomata tend to close with increasing concentration of CO₂.—*I. F. Lewis.*

865. EKAMBARAM, T. Note on the mechanism of the bladders of *Utricularia*. Jour. Indian Bot. Soc. 4: 73–74. 1924.—The author compares his own findings, reported in previous papers, with those of C. L. WITTHYCOMBE.—*Winfield Dudgeon.*

866. HAIRE, A. ANNA. Attempts at reversal of geotropic response. Papers Michigan Acad. Sci. Arts and Letters 3: 111–122. Pl. 16–17. 1924.—Other investigators have described cases of “reversed heliotropism” and “reversal of geotropic response” brought about by exposing the stems and roots to acid or alkaline vapors, respectively. The author attempted to obtain similar results with similar treatments, using seedlings of *Zea mays*, *Pisum sativum*, *Lupinus albus*, *Helianthus annuus*, *Avena sativa*, *Cucurbita maxima*, and a number of other plants. In the 1st series of experiments the seedlings grown in sphagnum moss and in soil were fastened to supports in jars lined with wet paper. A dish containing 10 cc. of 1% acetic acid was placed in the jar and all were held in the dark for 5–12 hours. Then the jar was turned on its side for 24 hours. The geotropic responses were normal. The atmosphere in the jar did not redden litmus paper at the end of this period. Using 5% acetic acid renewed every 12–15 hours, the experiment was repeated. The curvature of the stems was in the normal direction (negatively geotropic) but slightly less in magnitude than normal. The air turned blue litmus paper red. The result was similar when 10% acetic acid was used. Twenty per cent acetic acid killed the plants. Small’s experiment of coating the stem with vaseline so as to cause an accumulation of CO₂ in the tissue was repeated, and olive oil, also, was used. The stems were coated and kept in a vertical position 2–3 days in the dark, then placed horizontally. Some stems remained horizontal, without curvature. However, most of them bent upward but not to so great a degree as in the normal plants. Plants grown in an atmosphere rich in CO₂ showed either a weak upward curvature or no growth at all. As the stems elongate they may sag downward but this is not a growth curvature. Roots of *Zea mays* and *Vicia faba* were treated in a similar manner with NH₃ vapor. In this vapor cessation of growth and browning of the tip occurred at all but very weak concentrations. Where growth was absent, there was no curvature. Where it occurred, the curvature was downward except in a few cases where abnormal growth occurred in various directions.—*Ernst A. Bessey.*

867. LUNDEGÅRDH, H. Die Beziehungen zwischen der Lichtwachstumsreaktion und dem Phototropismus. [Relations between the light-growth reaction and phototropism.] Ber. Deutsch. Bot. Ges. 39: 195–200. 4 fig. 1921.—The author has studied (1) the relation existing between the phototropic reaction of the coleoptile tip of *Avena* and the intensity of the light stimulation, and (2) the rate of growth of the coleoptile during the curvature. Taking the maximum curvature as the measure of the reaction using light intensities of 0–1200 M.K.S. (meter-candle-seconds), and 10,000–8,100,000 M.K.S., he found that the reaction increased with increased light intensity when the latter was relatively low; but went over into a negative curvature with greater light intensities; finally, with very intense illumination, again becoming positive, with increasing and then decreasing sharpness. The author states that the curve of reaction-intensity and stimulus-intensity is to be considered as the resultant of 2 elementary curves, a positive and a negative of similar course, but of different stimulus thresholds. Relative to growth during curvature, the author found that growth and curvature bore an inverse relation to each other, the curve of one being the mirrored image of the curve of the other. Though acknowledging that superficially considered, these results seem to favor Blaauw’s theory of the nature of the phototropic reaction, the author states that computations based upon his measurements of growth and curvature contradict Blaauw’s theory.—*R. M. Holman.*

868. LUNDEGÅRDH, H. Zur Theorie der phototropischen Perzeption. [The theory of phototropic perception.] Ber. Deutsch. Bot. Ges. 39: 223–229. 2 fig. 1921.—The author reports further experiments bearing on the problem of “light direction or illumination gradient.” Using the coleoptile of *Avena* and a fine pencil of parallel rays for stimulation he observed the effect (1) of tangential illumination at right angles to the axis of the coleoptile and (2) of illumination of $\frac{1}{2}$ of the coleoptile tip from above. A light intensity of 64 m. candles was

used, the period of exposure ranging from 2 to 30 seconds. After stimulation, the plants were placed on the clinostat and the curvatures were recorded photographically 3 hours later. In the case of tangential, horizontal illumination the mean direction of the curvature differed only slightly from the direction of the light rays falling upon the coleoptile, but the longer the stimulation period the greater was the divergence between the directions of illumination and curvature up to 67.1° with 20 to 25 seconds illumination. The author explains the slight divergence with brief stimulation as due to the change of direction (by refraction) when the light enters the tissue of the coleoptile; the great divergence with longer stimulation as due to scattering of light within the coleoptile tissue and the reflection of light from the back wall of the coleoptile. In the experiments with illumination from above "exactly" $\frac{1}{2}$ of the apex of the coleoptile was lighted with "exactly" parallel rays. As in the previous experiment, a red light-screen was used while the adjustment of the light bundle was being made. Of the 81 coleoptiles tested, 30 curved toward the lighted side, 30 did not react, and 21 curved toward the dark side. The author states that, if the light gradient theory were correct, there should have been a great preponderance of curvatures toward the lighted side, since the light stimulus was sufficient to cause a marked reaction when the light fell in a slightly oblique direction. The slight excess of curvatures toward the lighted side over those toward the dark side he explains as due to refraction. He believes that these and other experiments of his previously published show that neither the light-growth reaction of Blaauw nor the light gradient theory supported by Buder and others can be accepted as explaining the phototropic curvatures in *Avena*.—*R. M. Holman.*

869. NEWCOMBE, F. C. Significance of the behavior of sensitive stigmas. II. *Amer. Jour. Botany* 11: 85-93. 1924.—In the African tulip-tree, *Spathodea campanulata*, the stigma lobes are slightly sensitive to pressure, but for complete closure both pressure and the presence of pollen are necessary. Unlike the condition in most species, the stigma here does not open after the 1st closing. Evidence is presented that the continued closure of the stigma lobes so as to enclose the pollen promotes, and in a dry atmosphere is necessary to, the germination of the pollen. The cause of the 2nd closing of the stigma, found in many species, is related to the amount of moisture in the air, since moist air will prevent closing or will sometimes induce a subsequent reopening. A list of 37 species with stigmas sensitive to contact is appended. These belong to the 5 families, Bignoniaceae, Scrophulariaceae, Martyniaceae, Acanthaceae and Lentibulariaceae.—*E. W. Sinnott.*

870. NEWCOMBE, F. C. The supposed reversal of geotropic response. *New Phytol.* 22: 281-288. 1923.—After a criticism of the evidence of Small and his students (see *Bot. Absts.* 10, Entries 298, 300, 301; 11, Entry 798) that reversal of geotropic response in seedlings may be induced by the use of acid and alkali vapors and of CO_2 , the author cites the consistently negative results of similar experiments with vapor of acetic acid, CO_2 , and NH_3 , as well as with shoots vaselined so as to cause the accumulation of CO_2 within the tissues. Small and his students seem to have been led into misinterpretation by distortion figures and by the behavior of sagging shoots too old and too weak to hold themselves erect.—*I. F. Lewis.*

871. WEBER, FRIEDL. Reizbewegungen an Gentianaceen-Blüten. [*Seismonastic movements of the flowers in the Gentianaceae.*] *Oesterreich. Bot. Zeitschr.* 73: 86-108. 1924.—When the expanded corolla of various gentians is stimulated, it closes more or less rapidly. According to the quickness of response, the different species of *Gentiana* can be grouped as follows: (1) Very rapid response: *Gentiana verna*, *G. nivalis*, *G. bavarica*, *G. utriculosa*; (2) rapid response: *Gentiana Clusii*, *G. Kochiana*, *G. Quadrifaria*, *G. pneumonanthe*; (3) slow or incomplete response: *Gentiana asclepiaden*, *G. cruciata*, *G. ciliata*; (4) without response: *Gentiana lutea*, *G. stiriacae*, *G. serrata*, and *G. amarella*. More or less the same degree of sensitiveness is shown to temperature changes. *Centaurium umbellatum* is especially sensitive to temperature changes, which makes it difficult to make correct observations on seismonastic responses. Rain tends to cause the corollas of *Gentiana verna*, *G. Clusii*, and *G. pneumonanthe* to close, while it has no effect on the flowers of *Gentiana lutea* and *G. asclepiadea*. The epidermal cells of the flowers are more or less filled with globules of fat; however, fat content and sensitiveness to shock are not correlated phenomena, though a few of the most sensitive forms have the smallest amount of fat.—*Ernst Artschwager.*

GERMINATION, RENEWAL OF ACTIVITY

872. CHEMIN, E. Sur la germination des graines de *Lathraea clandestina* L. [Seed germination in *Lathraea clandestina*.] Compt. Rend. Acad. Sci. Paris 178: 230-232. 1924.—This paper is a contribution to the discussion between Heinricher and the author as to whether the production of suckers is due to chemical or mechanical stimulation. The author holds to the latter interpretation. He found that seed of this plant can germinate without the intervention of a foreign root. The development of the embryo is slow and requires many months. The reserve food is sufficient to permit the root to attain a radius of about 4 cm.—C. H. Farr.

873. EBNER, H. Keimungsphysiologie von *Draba verna*, *Thlaspi perfoliatum*, *Holosteum umbellatum* und *Veronica hederifolia*. [Physiology of germination in *Draba verna*, *Thlaspi perfoliatum*, *Holosteum umbellatum* and *Veronica hederifolia*.] Oesterreich. Bot. Zeitschr. 73: 23-41. 1924.—The purpose of this study is to obtain a clearer insight into the physiology of germination, the periodicity of germination within the course of a year, and the effect of certain substances on shortening the rest period of the seed. It was found that seed of the 4 varieties studied behaved specifically as regards vigor and percentage of germination during the different months, that different chemical substances influenced each type of seed differently and that, therefore, it would be false to make generalizations concerning the behavior of other seed. The maximum stimulatory effect was: for *Draba verna*, absolute alcohol; for *Thlaspi perfoliatum*, low temperature and ether; for *Holosteum umbellatum*, absolute alcohol and ether, and for *Veronica hederifolia*, ultraviolet light, darkness, and low temperature.—Ernst Artschwager.

TEMPERATURE RELATIONS

874. GAIN, EDMOND. Anomalies des *Helianthus* issus de graines chauffées [de 120° a 150°C. [Abnormalities in sunflower plants arising from seed heated to 120-150°C.] Compt. Rend. Acad. Sci. Paris 178: 865-867. 1924.—Forty individuals were brought to the flowering stage, but did not fruit. This is perhaps due to the loss of certain vitamins necessary for the reproductive processes. The plants were teretological in certain anatomical respects. This is interpreted as giving weight to the phyllorhizic theory of normal morphological development. The abnormalities are described in some detail, including fasciation of stems, anomalies in branching, in leaf form, and in anatomical structure.—C. H. Farr.

875. GOLDSMITH, G. W. Factors involved in opening and closing of flowers. Carnegie Inst. Washington Year Book 22: 307-308. 1924.—The opening and closing movements of floral parts is effected by temperature changes in some forms and by changes in light intensity in others. Lowering the temperature causes closure in some flowers and raising it produces the same effect in others. Other notes are presented.—B. E. Livingston.

876. LEUKEL, R. W. Equipment and methods for studying the relation of soil temperature to diseases in plants. Phytopathology 14: 384-397. Fig. 1-5. 1924.—The soil temperature equipment used by the Office of Cereal Investigations, U. S. A. Dept. Agric., is described and illustrated as to dimensions and the materials used in construction of the tanks, tank covers, heaters, water pumps, thermoregulators, and electrical equipment and connections. General directions are given for operating the tanks at temperatures above and below the temperature of the surrounding air. The method of planting the seed and of handling the seedlings is also described in detail.—B. B. Higgins.

877. MORRISON, LETHE E., AND FRED W. TANNER. Studies on thermophilic bacteria. I. Aerobic thermophilic bacteria from water. Jour. Bact. 7: 343-366. 1922.—Bacteria which carry on their life functions at temperatures higher than 60°C. are commonly found in soil, water, milk, dust, air, food, etc. Their cultural characteristics are very similar; they are all capable of liquefying gelatin, all produce diastase, all produce H₂S from Witte and Difco peptone, and all reduce nitrates to nitrites. The chief differences in culture lie in their actions on milk and on carbohydrate broths, as well as in their reactions to various degrees of heat. In general the morphology of thermophilic bacteria is the same; they are spore-forming, motile rods, but minor variations are of value in further classification. A bibliography of over 100 entries is given.—C. E. Skinner.

878. NEWCOMBE, F. C. Optimum temperatures for growth of some grass coleoptiles. *Papers Mich. Acad. Sci. Arts and Letters* 3: 203-210. 1924.—In certain investigations on heliotropism, the author determined the optimum temperature for the growth of coleoptiles of 11 grasses, and, for comparison, the hypocotyls of 4 dicotyledons. Germination was carried on as uniformly as possible. The temperatures used were 24°, 26°, 28°, 30°, 32°, 34°, and 36°C. As soon as the seedlings appeared above the ground the pots were placed in the thermostat at these temperatures. The optima were as follows: *Sorghum vulgare* L., 31°; *Setaria italica* (L.) Beauv., 33°; *S. italica* var. *germanica* (Mill.) Richter, 33°; *Phalaris canariensis* L., 30°; *Phleum pratense* L., 30°; *Agrostis alba* L. var. *vulgaris* (With.) Thurber, 29°; *Dactylis glomerata* L., 29°; *Poa pratensis* L., 27°; *Lolium perenne* L., 30°; *Avena sativa* L., 30°; *Triticum sativum* L., 30°; *Lepidium sativum* L., 29°; *Brassica Napus* L., 31°; *Amaranthus gangeticus* L., 33°; *Papaver somniferum* L., 27°.—*Ernst A. Bessey.*

879. PEARSON, G. A. Temperature summations with reference to plant life. *Monthly Weather Rev.* 52: 218-220. 1924.—The ordinary methods of using temperatures as indices of growing conditions by means of maximum and minimum thermometers or the thermograph are unsatisfactory. Lehenbauer's method of physiological indices of temperature efficiency, based directly on the response of plants to heat, gives the most reliable results. Since plants vary in their heat requirements, indices of efficiency should be determined for each species, or at least for groups of species having approximately the same requirements.—*E. N. Munns.*

880. VIRVILLE, A. D. DE, ET F. OBATON. Etude biologique de l'épanouissement des fleurs. II. [Biologic study of the opening of flowers. II.] *Rev. Gén. Bot.* 36: 49-67. 1924.—For a long time it has been believed that the opening and closing of flowers was a phenomenon periodically reproduced at the same time of day. However, methodical observations made under natural conditions have led the authors to the conclusion that the movements of the corolla are dependent on the variable meteorology of the day, more particularly upon variations in temperature. Experiments made to study the isolated action of the different meteorologic factors have established the exact role of each. It was shown that temperature is the only agent that determines the movements of the petals as well as their fall, particularly in the case of ephemeral flowers. It was shown that flowers begin to open at very different degrees of temperature, thus explaining the interruption of flowering during rainy or cold weather, as well as the variability in time of flowering of different species. Cold prolonged the life of even the most ephemeral flowers. Heat, on the contrary, provoked their opening even at a time when they were never produced in nature, and likewise shortened their life. A study of light suppression or isolated from temperature showed this factor to be negligible except in so far as it influenced the nutrition of the plant. The action of the hygrometric state of the opening of the flowers was very feeble.—*J. C. Gilman.*

RADIANT ENERGY RELATIONS

881. DOGNON, A. Influence de la longueur d'onde sur la floculation d'une solution colloïdale par les rayons X. [Effect of wave length on the flocculation of a colloidal solution by X-rays.] *Compt. Rend. Soc. Biol.* 91: 197-199. 1924.—Using gum mastic dispersed in NaCl, the law of Guilleminot that the flocculating action of X-rays is not a function of the wave length was confirmed.—*Oran Raber.*

882. MURPHY, J. B., ET J. MAISIN. Parallèle entre l'action des rayons X et celle du goudron. [A parallel between the action of X-rays and that of tar.] *Compt. Rend. Soc. Biol.* 90: 974-975. 1924.—Attention is called to the many similarities between tar and X-rays in the production of skin irritations and tumors.—*Oran Raber.*

883. NODON, ALBERT. Recherches sur la radioactivité des cellules vivantes. [Research on the radioactivity of living cells.] *Compt. Rend. Acad. Sci. Paris* 178: 1101-1102. 1924.—In 3 dark chambers photographic plates were placed. To the 1st there was added a bit of barium radium sulphate, to the 2nd, a living insect, and to the 3rd, a green leaf. After 20 hours the 1st plate showed a strong photogenic impression; the 2nd, a weaker impression; and the 3rd presented a thin mist. By electrometric measurements it was determined that the radioactivity of the leaf is 2-3 times that of uranium; the insect, 8-13 times; and barium-radium sulphate, 15 times.—*C. H. Farr.*

884. SPOEHR, H. A., AND ARTHUR LOCKE. Effect of ultra-violet light on carbamino acids. Carnegie Inst. Washington Year Book 22: 54. 1924.—It is indicated that calcium carbamates are more sensitive to photo-oxidation than are the corresponding amino acids, but the bound carbonic acid of the carbamates is apparently not more readily reduced to formaldehyde or its equivalent than is that of the amino acids.—B. E. Livingston.

TOXIC ACTION

885. AVERSENQ, DELAS, JALOUSTRE, AND MAURIN. Action du thorium X sur la maturation des oeufs, la germination des graines, et l'accroissement des plantes. [Action of thorium X on maturation of eggs, germination of seed, and growth of plants.] Compt. Rend. Acad. Sci. Paris 178: 1491-1492. 1924.—Eggs of *Ascaris lumbricoides*, seed of *Raphanus*, and the growth of *Lemna polyrrhizae* were studied. Favorable action of a weak dose, and injury with a strong dose are reported.—C. H. Farr.

886. BRONFENBRENNER, J. Further studies on the potency of botulinus toxin. Proc. Soc. Exp. Biol. and Med. 21: 318. 1924.—NaCl had a deteriorating effect upon this toxin, greatest at the highest dilutions. Antagonism of salts had no effect. Kept in combination with serum its potency was not lost. Foreign serums increased the toxic action.—M. M. Brooks.

887. BRONFENBRENNER, J. Ionic nature of botulinus toxin. Proc. Soc. Exp. Biol. and Med. 21: 317. 1924.—The toxin is distributed between the gelatine and the fluid in the same ratio as the Cl-ion and inversely as the H-ion. This suggests that botulinus toxin is a mono-valent, negatively charged ion, at least between pH 2 and 8.0. The H-ion concentration changed the potency of the toxin.—M. M. Brooks.

888. CZURDA. [Rev. of: SAKAMURA, T. Über die Selbstvergiftung der Spirogyren im destillierten Wasser. (The self-poisoning of Spirogyra in distilled water.) Bot. Mag. Tokyo 36: 133-153. 1922.] Arch. Protistenk. 47: 141-142. 1923.

889. DISTASO, A. Sur les microbes cuprophiles. [Cuprophilous microbes.] Compt. Rend. Soc. Biol. 90: 1224-1225. 1924.—Cultures of *Bacillus tuberculosis* of human, bovine, and avian origin all take up Cu and when added to a culture medium containing 1% CuSO₄, take on characteristic Cu green color. Other acid-resistant bacteria do not behave like *B. tuberculosis*.—Oran Raber.

890. DOZIER, CARRIE CASTLE. Optimum and limiting hydrogen-ion concentrations for *B. botulinus* and quantitative estimation of its growth. XVI. Jour. Infect. Diseases 35: 105-133. Charts 1-7. 1924.—Both blood and beef heart favored development and growth of *Bacillus botulinus* when incorporated with the medium. Tomato essence activated development of the organism. Limiting reactions for growth appeared to be pH 5 and 9. The optimum was between 6.0 and 7.2. Growth at 26.5° or 39°C. facilitated growth and production of virulent toxin. Growth at lower temperatures permitted greater proliferation of the cells. The organism developed poorly in spinach unless the reaction was made nearly neutral. Reaction was found to be an important factor influencing development of the organism in vegetable media.—R. L. Starkey.

891. DOZIER, CARRIE CASTLE. Resistance of spores of *B. botulinus* to disinfectants. XVIII. Jour. Infect. Diseases 35: 156-176. 1924.—Five per cent phenol, lysol, or formaldehyde or 2% HCl failed to destroy *Bacillus botulinus* spores at 20°C. Neither 95% nor 77% alcohol proved lethal. One per cent iodine and 5% antiformin killed the spores within 30 minutes. Organic matter lengthened the time necessary for destruction in most cases. Dried spores were less resistant to desiccation than were moist spores. Ten per cent HCl was lethal within 45 minutes for both dried and moist spores. The effects of numerous other organic and inorganic compounds commonly used as disinfectants are discussed in relation to *B. botulinus* and other spore formers.—R. L. Starkey.

892. HAGAN, WILLIAM A. The reason for failure to obtain growth of an obligatory anaerobe (*Actinomyces necrophorus*) on plate cultures incubated in an anaerobic jar. Proc. Soc. Exp. Biol. and Med. 21: 568-570. 1924.—The data indicate that failures in anaerobic plating were due to injury of the bacterial cell forming the inoculum, by reason of their contact with air.—M. M. Brooks.

893. HAGAN, WILLIAM A. The formation of hydrogen peroxide by an obligatory anaerobe (*Actinomyces necrophorus*). The tolerance of this organism for peroxide. *Proc. Soc. Exp. Biol. and Med.* 21: 570-572. 1924.—“A rough idea of the concentration of H_2O_2 formed by the bacteria was obtained by making up various dilutions of titrated H_2O_2 in sterile media and comparing the color reactions of the benzidine test with those obtained in the cultures. . . . The reactions from the cultures generally were much stronger, at the height of the reaction, than the reaction obtained by the 1-100,000 dilution but not as strong as that obtained in a concentration of 1-10,000.”—*M. M. Brooks.*

894. KOSER, S. A., AND W. W. SKINNER. Viability of the colon-typhoid group in carbonated water and in carbonated beverages. *Jour. Bact.* 7: 111-121. 1922.—*Bacterium coli*, *Bact. typhosum*, and *Bact. paratyphosum* “B” are rapidly killed off at room temperatures (less rapidly at 1°C.) in carbonated beverages and in tap water charged with CO_2 . Citric and lactic acids used in beverages are also very detrimental to these organisms. Spore bearers as typified by the aerobe, *Bacillus mesentericus*, and the anaerobe, *Clostridium sporogenes*, resisted carbonated water for 1 month at room temperature with no measurable diminution in numbers.—*C. E. Skinner.*

895. ONODERA, I. Untersuchungen über die Wirkung der Gase, welche im Reisfelde bei der Zersetzung von Genge (*Astragalus sinicus*) entstehen, auf das Wachstum der Reispflanzen. [Effect of the gases formed by decomposition of *Astragalus sinicus*, on rice plants.] *Ber. Ohara Inst. Landw. Forsch.* 2: 361-382. 9 pl., 1 fig. 1923.—The gases formed by the decomposition of *A. sinicus* are chiefly methane and CO_2 . Their harmful action on the rice plant is chiefly due to the fact that they displace O_2 .—*H. S. Reed.*

896. ONODERA, L. Wie kann man die schädigende Wirkung der bei der Zersetzung von Genge (*Astragalus sinicus*) entstehenden Gase auf das Wachstum der Reispflanze verhindern? [How to diminish the harmful effect upon the growth of rice plants of gases arising from the decay of *Astragalus sinicus*.] *Ber. Ohara Inst. Landw. Forsch.* 2: 383-396. 1 fig. 1923.—Experiments indicated that the application of Ca salts often enabled the plants to make better growth.—*H. S. Reed.*

897. PACHECHO, GENESIO. Essais expérimentaux de l'action des colloïdes sur l'immunité. Immunité naturelle. [Effect of colloids on immunity. Natural immunity.] *Compt. Rend. Soc. Biol.* 90: 879-880. 1924.—Metallic colloids lower the ability to produce immunizing anti-toxins.—*Oran Raber.*

898. REBELLO, SILVIO. Action des glandes a sécrétion interne et de leurs extraits sur le développement des plantes. [Action of endocrine glands and their extracts on the development of plants.] *Compt. Rend. Soc. Biol.* 90: 1095-1097. 2 fig. 1924.—Using hyacinth bulbs and extracts from thymus, thyroid, etc., it was observed that development was retarded, especially by the freshly ground glands. It is suggested that this depressing action is of photodynamic origin but no definite conclusions are drawn.—*Oran Raber.*

899. REES, C. W. The microinjection of *Paramecium*. *Univ. California Publ. Zool.* 20: 235-242. 1922.—Barber's micro-injection pipette was used in a comparative study of the effects of toxins of *Ascaris* on *Paramecium* when taken in through the cytostome and when introduced directly into the living cytoplasm by the pipette. The solution of toxin (askaron) was not fatal to *Paramecium* when ingested, and it was no more fatal when injected than was the tap water solvent.—*R. P. Hall.*

900. RICHET, CHARLES. Action des formiates sur la croissance de certaines plantes cultivées en pot. [The action of formiates on the growth of certain plants cultivated in pots.] *Compt. Rend. Acad. Sci. Paris* 178: 1922-1923. 1924.— NH_4 , Mg, and Fe formates and formic acid were used on wheat and rice. Na and Ca formates were also employed later. With controls considered as 100, the plants so treated had a total weight of 117, number of stems 113, and average weight of each stem 103. An insignificant effect was found with 10 mgm. per pot. The optimum was 30 mgm. The effect was evident with 26 mgm. while there was none at all with 1000 mgm.—*C. H. Farr.*

901. RICHET, CHARLES, EUDOXIE BACHRACH, ET HENRY CARDOT. De la simultanéité de deux effets toxiques contradictoires (accoutumance et anaphylaxie) sur la même cellule. [The simultaneous occurrence of two toxic effects (increasing tolerance and increasing sus-

ceptibility) within the same cell.] *Compt Rend. Acad. Sci. Paris* 178: 535-537. *Fig. 1-2*. 1924.—The same cell may simultaneously acquire hypersusceptibility ("anaphylaxie") to one poison and increasing tolerance ("accoutumance") to another. The lactic acid organism is made to become accustomed to K arseniate and hypersusceptible to HgCl_2 or CuSO_4 . CuSO_4 , 0.00075% and K_3AsO_4 , 0.005%, were mixed in the same media. The control had neither. After 11 days, transfers were made to strong doses of CuSO_4 and K_3AsO_4 , respectively. After 24 hours on CuSO_4 there was 80% activity; and on K_3AsO_4 , 15-40%. For 0.000034% HgCl_2 the results were 39% after 1 day; 47%, after 13 days; and 86%, after 13 days. For 0.0006% K_3AsO_4 , 108% after 1 day; 390%, after 13 days; and 940%, after 13 days.—*C. H. Farr*.

902. RICO, J. TOSCANO. Action de l'étain et de quelques-uns de ses composés insolubles sur le *Staphylocoque doré*. [Action of tin and of some of its insoluble compounds on *Staphylococcus aureus*.] *Compt. Rend. Soc. Biol.* 90: 1098-1100. 1924.—The bacteria grew as well in agar with the tin and its compounds as without. It is concluded that the toxic action of tin and its insoluble compounds is extremely doubtful.—*Oran Raber*.

903. SARTORY, A., AND R. SARTORY. Sur le pouvoir antiseptique du bichromate de potasse et du bichromate de cuivre. [Antiseptic action of potassium bichromate and copper bichromate.] *Compt. Rend. Acad. Sci. Paris* 178: 1334-1337. 1924.—In most cases, 2 gm. per l. of K dichromate are necessary to completely stop the development of *Penicillium glaucum*, *Mucor racemosus*, *Rhizopus niger*, *Phycomyces splendens*, and *Sterigmatocystis nigra*; but 1 gm. of Cu bichromate is sufficient for most of the fungi tried. *Penicillium* is the most resistant and *Phycomyces* the most sensitive of the 5 fungi investigated. The structural modifications of the fungi are also greater with the Cu than with the K compound.—*C. H. Farr*.

MISCELLANEOUS

904. BECKER, H. G. Prevention of "bumping" during vacuum distillation. *Jour. Chem. Soc. [London]* 125: 460-461. 1 *fig.* 1924.

905. BROWN, J. HOWARD. Hydrogen ions, titration and the buffer index of bacteriological media. *Jour. Bact.* 6: 555-570. 1921.—The knowledge of the buffer content of a bacteriological culture medium is as important as the knowledge of its pH. A simple colorimetric method of determining the buffer index is described.—*C. E. Skinner*.

906. COLLET, M. Nouvel appareil à épuisement par les solvants volatils destiné surtout aux opérations en série ou aux épuisements fractionnés. [New apparatus for extraction with volatile solvents intended especially for serial or fractional extractions.] *Bull. Soc. Chim. Biol.* 5: 940-943. 1 *fig.* 1923.—An extraction apparatus in which the condensing member is reversible, 1 end of the tube being bent at an angle, is described. By using a special extractor member, the apparatus may be used in the ordinary way, or a solvent may be distilled from 1 flask, condensed by the condenser, and collected in a 2nd flask after it has percolated through the material to be extracted.—*Joseph S. Caldwell*.

907. KIPLINGER, CLAUDE CLAYTON. A simple method for determining the approximate index of refraction of liquids with a common microscope. *Jour. Chem. Soc. [London]* 125: 963-965. 1924.

908. PRIDEAUX, EDMUND BRYDEN RUDHALL, AND ALFRED THOMAS WARD. Calculations on the neutralization of mixtures of acids, and a universal buffer mixture. *Jour. Chem. Soc. [London]* 125: 426-429, 1 *fig.* 1924.

909. RAYBAUD, L. Essai de petit germeur automatique de laboratoire. [A type of small automatic germinator for the laboratory.] *Rev. Gén. Bot.* 36: 193-195. 1924.—A small germinator with an automatic siphon to control the supply of water is described and figured.—*J. C. Gilman*.

910. SAUNDERS, J. T. The determination of the salt error of indicators and the accurate estimation of the pH of the solutions by colorimetric methods. *Proc. Camb. Phil. Soc. Biol. Sci.* 1: 30-42. *Fig. 1-4*. 1923.

911. SIMON, L. J., ET L. PIAUX. Sur la caractérisation et le dosage de petites quantités d'acide pyruvique. [Recognition and estimation of small amounts of pyruvic acid.] *Bull. Soc. Chim. Biol.* 6: 477-478. 1924.—A colorimetric method based upon Legal's method depends

upon the formation of a blue color with Na nitroprussiate, NH_3 , and acetic acid. This is more rapid but less exact than a method for determination as phenylhydrazone by the use of parabromophenylhydrazine. The technique of each of these methods is described in detail.—*Joseph S. Caldwell.*

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 28, 30, 42, 46, 64, 72, 77, 161, 170, 175, 222, 234, 235, 387, 394, 435, 552, 622, 796)

912. BERNARD, CH. *Vigna en de biologische verbetering van den bodem.* [Vigna and the biological improvement of the soil.] Thee 4: 11-12. 1923.—Preliminary evidence is given of the effect of *Vigna oligosperma* on the number of earthworms in the soil.—*Carl Hartley.*

913. CHOUCHACK, D. *Influence des éléments nutritifs sur le développement des bactéries du sol.* [Influence of nutritive elements on the development of the bacteria of the soil.] Compt. Rend. Acad. Sci. Paris 178: 2001-2002. 1924.—It is contended that bacteria are lower plants, the nutritive mineral requirements of which are analogous to that of the higher plants. The difference between the amount of O_2 liberated from soil treated with oxygenated H_2O , and that liberated from the same amount of soil previously heated to 100°C . constitutes the "biological index," used as a basis for comparison. Mannite up to 1%, added to a soil containing 0.02% of N, P_2O_5 , and K_2O increased the biologic index of the soil. Ammonium nitrate, urea and sodium nitrate in 5 amounts gave similar results.—*C. H. Farr.*

914. DOWNING, R. G. *Sulphur as a fertilizer.* Agric. Gaz. New South Wales 35: 544. 1924.—The 1st year's results with S as a fertilizer upon alfalfa under irrigation, and upon oats, yielded negative results.—*L. R. Waldron.*

915. GUITTONNEAU, G. *Les Microsiphonées du sol.* [The Microsiphoneae of the soil.] Compt. Rend. Acad. Sci. Paris 178: 895-898. 1924.—The principal importance of these organisms is in humification.—*C. H. Farr.*

916. HARRIS, F. S., AND H. H. YAO. *Effectiveness of mulches in preserving soil moisture.* Jour. Agric. Res. 23: 727-742. Fig. 1-6. 1923.—In these laboratory and field experiments performed at the Utah Exp. Sta., studies were made of moisture losses from free H_2O surfaces, bare undisturbed soil, cultivated soil, and mulches of manure, wood shavings, grass, hay, and straw. The loss from saturated bare sand was about the same as from free H_2O . Sand with a 1-inch straw mulch lost 60% less moisture than bare sand. When mulched with 1 inch of hay, sand lost less moisture than clay, and clay lost less than loam. The efficiency of straw and sawdust mulches increased rapidly with depth until 2-3 inches were applied after which increased depth had less effect. From worst to best in preventing moisture loss, the order of the materials was: manure, wood shavings, grass, hay, and straw; these materials absorbed or held H_2O in inverse order to their effectiveness as mulches. Fall plowed land retained more moisture than spring plowed land. On dry-farm land a 4-inch cultivation of either spring or fall plowed land preserved moisture more effectively than deeper or shallower cultivation. Evidence is adduced showing that H_2O moves from mulched land to adjoining unmulched land. A bibliography of 48 references is given.—*F. S. Harris.*

917. HARRISON, W. H. *Report of the Imperial Agricultural Chemist.* Sci. Rept. Agric. Res. Inst. Pusa 1922-23: 23-32. 1923.—In the estimation of "available" phosphate of calcareous soils, Dyer's method has proved unreliable, but fairly satisfactory results were obtained by extraction with solutions of alkaline carbonates.—Pot cultures and field experiments show that CaSO_4 when applied either alone or in combination with green manures or monocalcic phosphate, exerts no beneficial effects, and in most cases actually depresses the crop yield. This effect of CaSO_4 is thought to explain the uncertain reaction of commercial superphosphate when applied to the fields at Pusa.—Continued investigation of the movement of nitrate shows that the accumulation in the surface soils is washed down into the deeper subsoil during the monsoon. A heavy application of green manure to 1 field decomposed quickly, but before the end of the monsoon the nitrate had been carried down so deeply as to

be of little benefit to the following cold weather crop. No evidence was obtained of any considerable upward movement of nitrate. For the conservation of nitrate, the best types of soil are those which possess a fairly heavy layer at depths of 3-4 feet.—*Winsfeld Dudgeon*.

918. LEBEDIANTZEFF, A. Accroissement de la fertilité par la dessiccation du sol à l'air dans les conditions naturelles. [Increase in fertility by desiccation of the soil with air under natural conditions.] *Compt. Rend. Acad. Sci. Paris* 178: 1091-1093. 1924.—From a study of the degree of desiccation occurring under natural conditions, it is concluded that the amount of desiccation naturally occurring in the superficial layers of the soil is such as to be beneficial to fertility.—*C. H. Farr*.

919. LEBEDIANTZEFF, A. Modifications subies par la terre végétale séchée à l'air. [Modifications undergone by agricultural soil dried in the air.] *Compt. Rend. Acad. Sci. Paris* 178: 960-963. 1924.—The desiccation of soil by free air involves both chemical and bacteriological changes. Uncultivated land is compared with soil subjected to a 3-year rotation. The layer above 20 cm. is compared with that between 20 and 40 cm. Desiccated soil is compared with undesiccated. Desiccation produces a large increase in organic matter, in total N, and in ammoniacal N, a considerable increase in P_2O_5 , very little, if any, change in mineral content, and a rapid diminution in bacteria.—The 2nd part of the paper deals with the effect of temperature and light on soil dried in air, without desiccation in air, and without desiccation or air. Oxygen and light gave negative results while heat was beneficial.—*C. H. Farr*.

920. LEBEDINATZEFF, A. Sur la répartition de la fertilité dans la couche arable selon la profondeur. [The distribution of fertility in the arable layers of the soil according to depth.] *Compt. Rend. Acad. Sci. Paris* 178: 1381-1383. 1924.—From a study of samples of soil taken from different depths, it was found that the upper layer of 5 cm. was the most fertile and that the fertility decreased with depth down to 50 cm., the fertility of the surface layer being approximately 20 times greater than that of the deepest 5 cm.-layer.—*C. H. Farr*.

921. LEBEDIANTZEFF, A. Sur la dessiccation des sols agricoles à l'air libre. [On the desiccation of the cultivated soils by free air.] *Compt. Rend. Acad. Sci. Paris* 178: 793-795. 1924.—Samples of soil were taken and divided into 2 parts, one being dried and the other used as a control. Of the 15 different crops grown, all showed better growth on the soil which had previously been dried than on the controls. Soils were also tested according to their previous use and according to the fertilizers which had been added. The effect of desiccation on different layers of the soil from the surface down to 80 cm. was also studied.—*C. H. Farr*.

922. LEOW, OSKAR. [Rev. of: STOKLASA, JULIUS. Über die Verbreitung des Aluminiums in der Natur und seine Bedeutung beim Bau- und Betriebsstoffwechsel der Pflanzen. (Occurrence of aluminum in nature and its significance in the metabolism of plants.) 464 p., 28 fig. Gustav Fischer: Jena, 1922.] *Forstwiss. Centralbl.* 46: 270-272. 1924.

923. LUNDEGÅRDH, HENRIK. Über die Kohlensäureproduktion und die Gaspermeabilität des Bodens. [The production of carbon dioxide and the gas-permeability of the soil.] *Ark. för Bot.* 18¹³: 1-36. 7 fig. 1923.—In this work special methods are described for the determination of the exhalation of CO_2 from the free soil surface and for the determination of the absolute production of CO_2 at different depths of the soil. The free soil expiration, the absolute production of CO_2 in the soil and the percentage of CO_2 in the soil air stand in a simple mathematical relation to one another and to the gas-permeability of the soil. In homogeneous soils the ratio, soil expiration: CO_2 percentage, gives an expression of the permeability. In heterogeneous soils the determination, too, of the absolute CO_2 production is necessary. Through parallel determinations of the production and the percentage of CO_2 in different depths of the soil, an idea is obtained of the permeability of the different soil layers. The permeability is directly proportional to the diffusion coefficient and may be expressed through the latter. A simple formula for calculation of this coefficient is proposed. The parallel determination of the absolute CO_2 production of the soil and the free soil-expiration gives an idea of the mass of CO_2 absorbed by the soil or carried away with the water. The gas-permeability of the soil is increased by physical loosening of the earth and by aridity; it is decreased by physical compactness and moisture. The absolute CO_2 production (activity) of the soil may have a very different distribution. Instances are given of homogeneous as well as of downward decreases and of totally heterogeneous distribution of activity. The activity

of a given weight of earth always decreases downward. The activity is accelerated by several factors that stimulate soil organisms, such as moisture, manuring, and improved airing. Within certain limits the pH and the quantity of humus in the soil do not stand in any closer relations to the activity. Through artificial manuring an increase of activity up to more than 800% was observed. The free soil expiration in unmanured arable earth has a medium value of about 0.4 gm. per 1 sq.m. per hour. Through manuring, this value may be multiplied. Forest soils give off much more CO₂. The mass of CO₂ expired by the soil is of the same approximate magnitude as that absorbed by the plants in assimilation.—*O. Heilborn.*

924. MARTIN, WM. H. The influence of sulfur on soil acidity and the control of potato scab. New Jersey Agric. Exp. Sta. Ann. Rept. 41: 590-598. 1920 [1921].—These investigations have been previously reported. Soil Sci. 9: 393-409. 1920. (See Bot. Absts. 7, Entry 1240.)

925. NEMEC, ANTONIN, ET KAREL KVAPIL. Sur l'intensité de l'assimilation de l'azote atmosphérique par les sols forestiers. [Intensity of assimilation of atmospheric nitrogen by forest soils.] Bull. Soc. Chim. Biol. 6: 515-520. 1924.—Determinations of the N content of humus and of the underlying soil from forests of varying character are reported. A known amount of humus or soil was moistened with a N-free culture solution, kept for 30 days, and the change in N content during the period determined. In soil from dense growths of *Epicea*, *Pinus sylvestris*, beech, and *Quercus pedunculata*, pure or in mixed stands, regardless of age, there was very considerable gain in the N content of humus but a small gain or a sensible loss in that of the subsoil. In the material from open forests of *Pinus sylvestris* or birch, or coppices of *Epicea*, basswood, hornbeam and maple, there was an increase in the N content of the soil and a loss in the humus, due to the incompletely decomposed condition of the latter. The accumulation of N in the humus layer is most active in the coniferous forest, and least active in the broad-leaved forest. When conifers and broad leaved forms are in mixed stand, there is but little increase in N in the humus layer but a very decided increase in the subjacent soil layer.—*Joseph S. Caldwell.*

926. NOLTE, O. Gründung in theorie und praxis. [Green manuring in theory and practice.] Flugschr. Deutsch. Landw. Ges. [Berlin] 23. 1-43. 4 graphs. 1923.

927. ROBINSON, R. H. Action of sodium nitrite in the soil. Jour. Agri. Res. 26: 1-7. 1923.—When NaNO₂, with and without CaCO₃, was added to each of several acid, neutral, and alkaline soil types there was practically no oxidation of the nitrites to nitrates. The nitrite was lost rapidly from the acid soils by decomposition; but this loss was retarded somewhat by CaCO₃. The nitrites decomposed slowly in the neutral and alkaline soils. When the moisture content of the soil was reduced the loss of nitrites was more rapid. It is recommended that commercial fertilizer composed mainly of NaNO₂ should not be used on an acid soil.—*Author.*

928. RUPRECHT, R. W. Report of the physiological chemist. Florida Agric. Exp. Sta. Ann. Rept. 1921: 22R-24R. 1921.—Phosphoric acid produced vigorous plants in the early stages of growth of the Irish potato but raw rock phosphate failed to produce maximum top growth. Pebble phosphate, in 1920, gave a yield almost equal to that from acid phosphate. Soft phosphate has had less effect than the pebble phosphate. In the absence of sufficient potash, tubers did not reach full size, and in extreme scarcity of potash, the normal growth of the tops was also interfered with and certain appearances developed which were characteristic of potash starvation. The study of the availability of various forms of phosphoric acid for citrus trees is being continued.—*J. C. Th. Uphof.*

929. SMOLIK, LADISLAV. Influence de la chaleur sur la surface totale offerte par les éléments du sol. [Influence of heat on the total surface presented by soil particles.] Compt. Rend. Acad. Sci. Paris 178: 2266-2269. 1924.—It is claimed that by determining the hygroscopicity of fresh, and air dry soil, and of soil dried at 50°C., 100°C., and 150°C., the variation in the size of the soil particles can be estimated. It was found that hygroscopicity is reduced by drying, which would indicate that the total absorbing surface of the soil particles had been reduced through an increase in the size of the particles.—*C. H. Farr.*

930. STEWART, ROBERT. Lime materials for soil improvement. Amer. Fruit Grower 44: 8, 30. Illus. 1924.—A discussion is given of the burning and grinding of limestone rock for use in soil improvement, the cost of the 2 forms of material, and of their use for the better production of a suitable cover crop.—*Arthur S. Rhoads.*

931. WHITTLE, C. A. Acid phosphate and soil acidity. *Citrus Indust.* 4: 32. 1923.—This brief article is designed to overcome the popular opinion that the use of acid phosphate makes the soil acid or sour. Long use of acid phosphate by various experiment stations is said to show no sign of increased soil acidity, and agricultural authorities are said to agree that acid phosphate causes no injury.—*Arthur S. Rhoads.*

932. WINOGRADSKY, S. Sur la microflore autochtone de la terre arable. [The autochthonous microflora of agricultural land.] *Compt. Rend. Acad. Sci. Paris* 178: 1236-1239. 1924.—In the degradation of organic matter in the soil there are 2 successive periods and 2 large groups of organisms concerned. The 1st period is characterized by rapid and violent changes, due to organisms easily isolated for study. During the 2nd period the changes take the form of slow combustion which has been studied by chemists, but which has not claimed the attention of the microbiologists. Special attention is called to humicole organisms which comprise the autochthonous microflora of arable land.—*C. H. Farr.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 141, 184, 196, 199, 225, 239, 344, 446)

GENERAL

933. BAILEY, L. H. The cultivated evergreens. A handbook of the coniferous and most important broad-leaved evergreens planted for ornament in the United States and Canada. *Roy. 8vo.* xvii + 434 p. 48 pl., 97 fig. The Macmillan Company: New York, 1923.—The present volume consists of several closely related articles written by specialists, developed on a carefully projected plan, brought together and edited by L. H. Bailey. The work is presented in 4 parts: (1) the place and care of coniferous (Gymnospermous) evergreens grown for ornament, (2) the kinds of cultivated conifers (Gymnosperms) in North America, (3) certain broad-leaved evergreens, and (4) inventory of woody evergreens grown in North America. The 1st part is concerned primarily with the coniferous evergreens in the landscape, their cultivation and propagation, their adaptation to different parts of the country and the insects and diseases injurious to conifers. The 2nd part contains a systematic treatment of the Coniferae cultivated in North America, including ample keys for the determination of genera and species, and lucid descriptions of genera, species, and varieties. The 3rd part includes a similar taxonomic treatment for the cultivated broad-leaved evergreens. The 4th part consists of an alphabetically arranged check list of woody evergreens of North America.—*Grace Gilmor.*

934. BLACK, J. M. Flora of South Australia. Part II. Casuarinaceae-Euphorbiaceae. *Roy. 8vo.* P. 155-358. Pl. 10-34, fig. 35-158. R. E. E. Rogers: Adelaide, 1924.—The present part begins with the Casuarinaceae and continues through the Euphorbiaceae, following consistently the plan of the 1st part, but with more numerous illustrations. The following combinations with name-carrying synonyms in parentheses are designated as new: *Muehlenbeckia diclina* (*Polygonum diclinum* F. v. M.), *Kochia tomentosa* (Moq.) F. v. M. var. *appressa* (K. *appressa* Benth.), *Pachycornia triandra* (*Arthrocnemum triandrum* F. v. M.), *Blennodia procumbens* (*Sisymbrium procumbens* Tate), *Hutchinsia cochlearina* (*Capsella cochlearina* F. v. M.), *H. ochrantha* (C. *ochrantha* F. v. M.), *H. Drummondii* (C. *Drummondii* F. v. M.), *H. humistrata* (C. *humistrata* F. v. M.), *Drosera Whittakeri* Planch. var. *praefolia* (D. *praefolia* Tepper), *Eutaxia microphylla* (*Sclerothamnus microphyllus* R. Br.), *Boissiaea cinerea* R. Br. var. *tenuicaulis* (B. *tenuicaulis* Grah.), *Templetonia stenophylla* (*Boissiaea stenophylla* F. v. M.), *Swainsona canescens* (Benth.) F. v. M. var. *Horniana* (S. *Horniana* Tate), *Geijera linearifolia* (*Eriostemon linearifolium* DC.), and *Micrantheum Tatei* (*Phyllanthus Tatei* F. v. M.).—*J. M. Greenman.*

935. DYKES, W. R. A handbook of garden Irises. 8vo. vii + 250 p., 24 pl. Martin Hopkinson & Co. Ltd.: London, 1924.—This work, the 3rd from the well known writer on the very interesting genus *Iris*, lays no claim to completeness nor to detailed monographic presentation. It is intended primarily for gardeners and to bring within a limited scope "all the species, which are at all adequately known, to enable them to be recognized and cultivated with some chance of success." A general discussion of the various sections of the genus and their distribution is followed by a key to the sections. Each section is then considered separately, and a key is provided for the determination of the species constituting the section. Popular descriptions are given of the species and varieties and their geographical distribution is indicated. Suggestive notes are added on cultivation.—*J. M. Greenman.*

936. SUNDFÆR, JOHN. Floraen i Nidaros bispedømme. [The flora of the Nidaros diocese.] xiii + 236 p. Trondhjem, 1923.—This is a flora, primarily intended for schools, containing analytical tables and descriptions of all species found in the diocese, as well as notes on their distribution.—*K. Münster Strøm.*

937. WALPOLE, BRANSON A. Flora of Washtenaw County, Michigan. 80 p., 1 map. Dept. Nat. Sci., Michigan State Normal Coll.: Ypsilanti, Michigan, 1924.—Washtenaw County, Michigan, is cut up into morainic hills and plateaus, valleys, plains, etc., with variation in elevation above sea level from 660 to 1100 feet. The soils are clays, sands, gravels, loams, silts, mucks, marls, and intermediate types. The transition from one type to another may be exceedingly abrupt. Short descriptions are given of the more important collecting localities which were visited regularly at different seasons of the year for several years. The list contains all the known vascular species reported from the county, with habitat and locality indications for each. This list comprises 29 species of ferns and fern-allies, 3 gymnosperms, 315 monocotyledons and 875 dicotyledons, a total of 1222 species. The largest families are: Gramineae, 33 species; Cruciferae, 41 species; Rosaceae, 31 species; Fabaceae, 51 species; Ammiaceae, 24 species; Labiatae, 30 species, Scrophulariaceae, 34 species; Compositae, 114 species. *Asarum ypsilantense* is described as new.—*Ernst A. Bessey.*

PTERIDOPHYTES

938. ABBOTT, MRS. FREDERICK P. Ferns along the Saco from Salmon Falls to the sea. Maine Naturalist 3: 23-25. 1 pl. 1923.—Thirty-four different kinds of ferns are recorded. The scientific and common name is given in each case.—*J. M. Greenman.*

939. COBURN, LOUISE H. Ferns of Skowhegan and vicinity. Maine Naturalist 3: 11-14. 1 pl. 1923.—Thirty-five species and varieties of ferns are recorded from the vicinity of Skowhegan, Maine.—*J. M. Greenman.*

940. MAXON, W. R. A third species of *Atalopteris*. Proc. Biol. Soc. Washington. 37: 63-64. 1924.—*Atalopteris Ekmani* is described as new from Haiti.—*J. C. Gilman.*

941. MAXON, WM. R. Further notes on Hispaniola ferns. Jour. Washington [D. C.] Acad. Sci. 14: 195-199. 1924.—From material on loan from the Berlin Bot. Mus. and from specimens in the National Herbarium collected by W. L. Abbott and E. C. Leonard in the Dominican Republic and Haiti, respectively, 3 new species are described: *Danaea Urbani*, *Hypolepis tenerima*, and *Pteris hispaniolica*. Other species noted which are rare or not previously known from Hispaniola are: *Botrychium Underwoodianum* Maxon, *Botrychium Jenmani* Underw. and *B. obliquum* Muhl. of the Ophioglossaceae; *Marattia Kaulfussii* J. Sm. of the Marattiaceae; *Hypolepis Urbani* Brause, *Polypodium Jenmani* Underw., *P. arcuatum* Moritz., *P. plesiosorum* Kunze, *P. surucuchense* Hook., *Oleandra guatemalensis* Maxon and *Dryopteris Linkiana* (Presl.) Maxon of the Polypodiaceae; *Selaginella lasiophylla* A. Br. and *S. longispicata* Underw. of the Selaginellaceae.—*Helen M. Gilkey.*

942. MAXON, WM. R. New or critical ferns from Haiti. Jour. Washington [D. C.] Acad. Sci. 14: 86-92. 1924.—The following new species are described: *Cheilanthes Leonardi*, *Hypolepis hispaniolica*, and *Dryopteris Abbottiana*. *Dryopteris subincisa haitiensis* Brause is raised to specific rank as *D. haitiensis* (Brause) Urban & Maxon; and new combinations are *Pteridium arachnoideum* (Kaulf.) Maxon, *Struthiopteris Tuerckheimii* (Brause) Maxon, and *Dryopteris alata* (L.) Maxon. The following are reported for the 1st time from Haiti: *Adiantum cuneatum* Langsd. & Fisch., *Asplenium heterochroum* Kunze, *Asplenium resilientis*

Kunze, *Dryopteris asterothrix* (Fée) C. Chr., *Polystichum machaerophyllum* Slosson, and *P. polystichiforme* (Fée) Maxon. *Dryopteris rudis* (Kunze) C. Chr. is also reported, though this has been collected previously in Haiti.—*Helen M. Gilkey.*

943. MAXON, W. R. New or noteworthy ferns from the Dominican Republic. Proc. Biol. Soc. Washington 37: 97-104. 1924.—Notes are given concerning the ferns collected by W. L. ABBOTT in 1922 and 1923. Thirty-eight species are mentioned of which 1, *Cyathea Abbotti*, is new.—*J. C. Gilman.*

944. MAXON, WM. R. New West Indian ferns. Jour. Washington [D. C.] Acad. Sci. 14: 139-145. 1924.—The 6 following new species are described; Maxon is the author unless otherwise designated: *Cyathea Brittoniana*, *Polypodium oxypholis*, *Stenochlaena amydrophlebia* Slosson, *Dryopteris petiolata*, *D. aripensis* C. Chr. & Maxon, and *Leptochilus pergamentaceus*.—*Helen M. Gilkey.*

945. MAXON, WM. R. Two new species of *Jamesonia*. Jour. Washington [D. C.] Acad. Sci. 14: 72-74. 1924.—*Jamesonia brunnea* and *J. ceracea* are new species described from specimens collected in the Andes of South America.—*Helen M. Gilkey.*

946. MURCH, FLORA. Ferns of South Paris and vicinity. Maine Naturalist 3: 54-55. 1923.—Twenty-six species of ferns are recorded from the vicinity of South Paris, Oxford County, Maine.—*J. M. Greenman.*

947. NYE, HARRIET A. Ferns of Fairfield. Maine Naturalist 3: 52-54. 1923.—Record is made of 31 species and varieties of ferns from the town of Fairfield, Maine.—*J. M. Greenman.*

948. SCAMMON, EDITH. Ferns in my pine lot. Maine Naturalist 3: 18-20. 1923.—Twenty-seven different ferns are recorded from the region of Saco and Hollis, Maine.—*J. M. Greenman.*

SPERMATOPHYTES

949. ANONYMOUS. A handbook of conifers. [Rev. of: DALLIMORE, W., AND A. BRUCE JACKSON. A handbook of Coniferae: including Ginkgoaceae. xi + 570 p. 32 pl. E. Arnold and Co.: London, 1923 (see Bot. Absts. 13, Entry 3996).] Nature 113: 707. 1924.

950. ARTHUR, J. C. New combinations. Torrey 24: 52. 1924.—*Euphorbia macropodoides* Rob. & Greenm. is transferred to *Zygophyllidium*, and *Tradescantia Pringlei* S. Wats. becomes *Commelinantia Pringlei* (S. Wats.) Tharp n. comb.—*J. C. Nelson.*

951. BENOIST, R. Descriptions d'espèces nouvelles de Phanérogames. [New phanerogamic species.] Bull. Mus. Hist. Nat. [Paris] 27: 193-199. 1921.—The author describes *Inga alata* and *Lanessania oligandra* from French Guiana, and *Hygrophila Perrieri* from Madagascar.—*John M. Fogg, Jr.*

952. BLAKE, S. F. Eight new Asteraceae from Mexico, Guatemala, and Hispaniola. Proc. Biol. Soc. Washington. 37: 55-61. 1924.—*Erigeron Ortegae*, *Guardiola stenodonta*, *Montanoa pteropoda*, *Hymenostephium superaxillare*, *Verbesina peninsularis*, *Perityle macromeres*, *P. trichodonta*, and *Anastraphia cneantha* are described as new.—*J. C. Gilman.*

953. BLAKE, S. F. New Polygalas from Colombia. Bull. Torrey Bot. Club 51: 83-89. 1924.—*Polygala diversa*, *P. Smithii*, *P. Pennellii*, *P. subsecunda*, and *P. apodanthera* are described as new species, and *Polygala Fendleri* Chod. var. *heterothrix* as a new variety.—*P. A. Munz.*

954. BRITTON, N. L., AND J. N. ROSE. Studies of the Cactaceae. Carnegie Inst. Washington Year Book 22: 288. 1924.—This is a progress report.—*B. E. Livingston.*

955. BUXBAUM, F. Diagnosen neuer Pflanzen aus Süd-Brasilien. I. [Descriptions of new plants from southern Brazil.] Oesterreich. Bot. Zeitschr. 73: 119-122. 2 fig. 1924. The following species and varieties are described: *Drosera villosa* St. Hil. var. *bifurca*, *Bombax columellatum*, *B. anisophyllum*, and *Waltheria communis* St. Hil. var. *erosa*.—*Ernst Artschwager.*

956. CHRISTY, MILLER. *Primula vulgaris* var. *caulescens*. New Phytol. 22: 233-239. 1923.—The "hybrid" oxlip (*Primula veris* × *vulgaris*) has been widely confused with the very similar *P. vulgaris* var. *caulescens*. The variety is of the pure primrose type except that its flowers are borne in umbels.—*I. F. Lewis.*

957. CLEMENTS, F. E., AND H. M. HALL. Phylogenetic method in taxonomy. Carnegie Inst. Washington Year Book 22: 309. 1924.—This is mainly a brief abstract of Publication 326

of the Carnegie Inst. Washington, by Hall and Clements, under the title here given. (See also Bot. Absts. 13, Entry 1267.)—*B. E. Livingston.*

958. COCKERELL, T. D. A. A yellow variation of *Eustoma* (Gentianaceae). *Torrey* 24: 50-51. 1924.—A new form of *Eustoma Russellianum* (Hook.) Griseb. is published as forma *flaviflorum*. It was collected near Denver, Colorado, in 1914 and differs from the species in having clear yellow flowers.—*J. C. Nelson.*

959. COLIN, H. Betterave sucrière et Betterave fourragère. [Sugar beets and fodder beets.] *Compt. Rend. Acad. Sci. Paris* 178: 2120-2122. 1924.—These 2 kinds of beets are compared in the following way, with a view to arriving at a basis for classifying varieties of beets into the groups given above: (1) Reducing sugars are generally held to be more abundant in the stem of fodder beets, although they are as a matter of fact rare in many beets, and there is not much in *Beta maritima*; (2) the difference in sucrose content is more marked in young plants than in mature ones; (3) vascular rings are less numerous in the fodder beets, but on the contrary the interstitial parenchyma is more abundant; (4) the seed of the 2 groups are not diagnostically different and the seedlings have no appreciable anatomical difference; (5) the leaves are likewise not good criteria. It is concluded that the 2 groups must be distinguished by characters associated with the storage organ.—*C. H. Farr.*

960. FARWELL, OLIVER ATKINS. Notes on the Michigan Flora VI. *Papers Michigan Acad. Sci. Arts and Letters* 3: 87-109. 1924.—This is a record of plants collected mainly in 1922 by the author, usually accompanied by Bruno Gladewitz and sometimes by others. New stations are recorded, as well as species new to the state. *Erucastrum gallicum* (Willd.) O. E. Schulz and *Vicia gracilis* Lois., both along the railroad tracks near Ypsilanti, are considered to be new to North America. The following new forms and combinations are proposed: *Woodwardia virginica* (L.) Sm. f. *fertilis* n. f., *Botrychium dissectum* Spreng. var. *tenuifolium* (Underw.) n. comb. (*B. tenuifolium* Underw.), and var. *oneidense* (Gilbert) n. comb. (*B. obliquum* var. *oneidense* (Gilbert) Waters), *B. multifidum* (Gmel.) Rupr. var. *simplicius* n. var., *Narukila ovata* (L.) n. comb. (*Phrynium capitatum* Willd., *Pontederia ovata* L.), *Unisema cordata* (L.) n. comb. (*Pontederia cordata* L.), also f. *angustifolia* (Pursh) n. comb. (*Pontederia angustifolia* Pursh), and f. *latifolia* n. f., *Phrynium dubium* (Jacq.) n. comb. (*Heteranthera dubia* (Jacq.) MacM.), *P. dubium* var. *terrestre* n. var. *Fagus americana* Muench f. *caroliniana* (Loud.) n. comb. (*F. ferruginea* var. *caroliniana* Loud.), *Quercus Muhlenbergii* Engelm. var. *Alexandri* (Farwell) n. comb. (*Q. acuminata* var. *Alexandri* Farwell), *Polygonum pennsylvanicum* L. var. *viridialbum* n. var. *P. sagittatum* L. var. *ovalifolium* n. var., *Allionia Nyctaginea* Michx. var. *minor* (Choisy) n. comb. (*Oxybaphus glabrifolius* Vahl. var. *minor* Choisy, *O. Nyctagineus* (Michx.) Sweet var. *oblongifolius* A. Gr., *A. Nyctaginea* Michx. var. *ovata* (Pursh) Morong), *Silene antirrhina* L. f. *apetala* n. f., *Hepatica americana* f. *purpurea* (Farwell) n. comb. (*H. Hepatica* var. *purpurea* Farwell), *H. americana* var. *parviflora* (Raf.) n. comb. (*H. Hepatica* var. *parviflora* (Raf.) Farwell), also a form of this variety of f. *Cahnae* n. f., *Erysimum officinale* L. var. *leiocarpum* (DC.) n. comb. (*Sisymbrium officinale* var. *leiocarpum* DC.) *Phaca neglecta* T. & G. f. *Limonia* n. f., *Falcata bracteata* (L.) n. comb. (*Glycine bracteata* L., *G. monoica* L.), *Verbena urticifolia* L. var. *simplex* n. var., *Monarda mollis* L. f. *albiflora* n. f., *Campanula rotundifolia* L. var. *intercedens* (Witasek) n. comb. (*C. intercedens* Witasek), and 2 forms of this variety f. *linifolia* n. f. and f. *dubia* (A. DC.) n. comb. (*C. dubia* A. DC.), *Laciniaria spicata* (L.) O. K. f. *albiflora* (Britt.) n. comb., *Helianthus Maximiliani* Schrad. var. *paniculata* n. var., *Achillea lanulosa* Nutt. f. *rubicunda* n. f., *Cichorium Intybus* L. f. *rubicunda* n. f., also f. *alba* n. f., *Lactuca canadensis* L. var. *longifolia* (Michx.) Farwell f. *angustipes* (Wieg.) n. comb. (*L. canadensis* var. *typica* f. *angustipes* Wieg.) *L. canadensis* var. *latifolia* O. K. f. *pallida* n. f.—*Ernst A. Bessey.*

961. GUPTA, B. L., AND P. C. KANJILAL. A new species of *Diospyros*. *Indian Forest* 50: 254-257. Pl. 11-12. 1924.—The new species is *Diospyros Holeana* named after R. S. Hole, Indian botanist. The tree is of medium size and was found along the Nepal border and in the Sungarrah forest.—*E. N. Munns.*

962. HALL, H. M. Taxonomy of *Haplopappus*. *Carnegie Inst. Washington Year Book* 22: 309-310. 1924.—It is logical "to accept *Haplopappus* in approximately the sense of Bentham and Hooker and of Gray, but with certain readjustments."—*B. E. Livingston.*

963. HALL, H. M. *Taxonomy of the Madieae*. Carnegie Inst. Washington Year 22: 310. 1924.—This is a progress report on studies of garden cultures and field observations. Some notes on the genus *Hemizonia* are given.—B. E. Livingston.

964. HEIMERL, A. *Circium Khekianum* Porta (*C. carniolicum* × *pannonicum*). Oesterreich. Bot. Zeitschr. 73: 130-131. 1924.—This is a description of a new hybrid of *Circium*, found in northern Italy.—Ernst Artschwager.

965. HOLE, R. S. A new species of *Hopea*. Indian Forester 44: 575-576. 1918.—*Hopea canarensis* from the hill forests of S. Canara is described and recorded as a species new to science.—J. M. Greenman.

966. Юзепчук, С. В. [JUZEPSHUK, S. V.] *Новый вид дриады*. [New species of *Dryas*.] Журнал Русского Ботанического Общества [Jour. Russian Bot. Soc.] 4: 18-25. 1 fig. 1920.—*Dryas grandis* is described as new from eastern Siberia.—Al. Ilinski.

967. KILLIP, ELLSWORTH P. New species of *Passiflora* from tropical America. Jour. Washington [D. C.] Acad. Sci. 14: 108-116. 1924.—The following 13 new species are described: *Passiflora dioscoreaefolia*, *P. podadenia*, *P. miraflorensis*, *P. laticaulis*, *P. Standleyi*, *P. cobanensis*, *P. gracillima*, *P. Gleasoni*, *P. capparidifolia*, *P. Pennellii*, *P. hastifolia*, *P. Buchtienii*, and *P. retrorsa*. A new subspecies described is *P. pedata stipularis*.—Helen M. Gilkey.

968. KILLIP, ELLSWORTH P. Notes on *Tacsonia*. Jour. Washington [D. C.] Acad. Sci. 14: 212-213. 1924.—Study of a large amount of material from Colombia and the Andes has convinced the author that characters formerly distinguishing the genus *Tacsonia* from *Passiflora*, are neither sufficiently constant nor important to justify the retention of the former as a genus. Therefore the following new names and combinations are proposed: *Passiflora coactilis* (*Tacsonia coactilis* Mast.), *P. ecuadorica* (*T. hederacea* Mast., *T. cyanea* Sodiro), *P. Mandoni* (*T. Mandoni* Mast.), *P. psilantha* (*T. psilantha* Sodiro).—Helen M. Gilkey.

969. KNOLL, F. *Pothos celatocaulis* N. E. Brown, eine Art der Gattung *Raphidophora*. [Pothos celatocaulis, a species of the genus *Raphidophora*.] Oesterreich. Bot. Zeitsch. 73: 73-85. 3 fig. 1924.—This is a description of vegetative and reproductive organs of the plant, and its transfer to the genus *Raphidophora*.—Ernst Artschwager.

970. LECOMTE, H. Un pin remarquable de l'Annam. [A remarkable pine from Annam. Bull. Mus. Hist. Nat. [Paris] 27: 191-192. 1 fig. 1921.—The author describes and figures a new species of pine, *Pinus Krempfii*, from the mountains of Annam, Indo-China.—John M. Fogg, Jr.

971. LYNCE, B. Vascular plants from Novaya Zemlya. Report on the scientific results of the Norwegian expedition to Nova Zembla 1921. No. 13. P. 1-151. Pl. 1-47. Christiania, 1924.—A treatise is given on the vascular flora of Nova Zembla based upon the material collected by the author during the 1921 expedition, and on his observations in nature. After an introduction on the history of the previous botanical researches in Nova Zembla and a brief outline of the events of the expedition the special part follows, dealing systematically with all the 155 species found by the expedition. The taxonomy, ecology, biology and distribution of every species is thoroughly discussed and on 20 of the accompanying plates the known distribution is marked on 1 map for each species. The genus *Poa* is dealt with by C. A. M. LINDMAN, *Taraxacum* by J. HOLMBOE, *Salix* by J. LID. The following new species or varieties are described: *Ranunculus auricomum* L. var. *glabrata* n. var., *Taraxacum Novæ-Zemliæ* Holmboe n. sp. *Poa alpigena* (Fr.) Lindman is raised to specific rank. The islands are divided into 7 natural provinces and the occurrences of all the 189 species known from Nova Zembla are tabulated accordingly. Illustrations of several plants are given, as well as photos of the more interesting localities.—K. Münster Strøm.

972. MUNZ, PHILIP A., AND IVAN M. JOHNSTON. Miscellaneous notes on plants of Southern California—III. Bull. Torrey Bot. Club 51: 295-302. 1924.—Taxonomic changes are made and new plants are described as follows: *Eriogonum Kennedyi* Porter var. *austromontanum* and forma *alpigenum*, *Malvastrum clementinum*, *M. fasciculatum* (T. & G.) Greene var. *laxiflorum* (Gray), *Styrax officinalis* L. var. *fulvescens* (Eastw.) S. *officinalis* L. *californica* (Torr.), *Phacelia Keckii*, *Galium gabrielense* Downingia *immaculata*, and *Stephanomeria Blairi*.—P. A. Munz.

973. PELLEGRIN, F. *Plantae Letestuanæ novæ ou Plantes nouvelles récoltées par M. Le Testu de 1907 à 1919 dans le Mayombe congolais, II.* [New plants collected by Le Testu in Mayomba.] Bull. Mus. Hist. Nat. [Paris] 27: 193-197. 1921.—The following new species are described: *Homalium LeTestui*, *Garcinia LeTestui*, *G. nyangensis*, *G. ngouniensis*, *Scaphopetalum LeTestui*, and *Cola itsoghensis*.—John M. Fogg, Jr.

974. PIPER, CHARLES V. The genus *Oxyrhynchus* Brandegeë. Jour. Washington [D. C.] Acad. Sci. 14: 46-49. 1 pl. 1924.—A new species, *Oxyrhynchus alienus* is described from plants grown at Austin, Texas; *Dolichos insularis* Britton is referred to *Oxyrhynchus insularis*; and new notes on *O. volubilis* Brandeg. are recorded.—Helen M. Gilkey.

975. Преображенский, Г. А. [ПРЕОБРАЗHENSKI, G. A.] *Acanthophyllum transhyrcanum* G. Preobr. Ботанические Материалы Гербария Главного Ботанического Сада. [Not. Syst. Herb. Hort. Bot. Petropolitani] 1: 1-3. 1920. *Acanthophyllum transhyrcanum* from the Transcaspiian Region is described as new; it is referred to the section *Paniculata*.—C. W. Dodge.

976. RUSSELL, PAUL. Identification of the commonly cultivated species of *Cucurbita* by means of seed characters. Jour. Washington [D. C.] Acad. Sci. 14: 265-269. Fig. 1. 1924.—Of the 3 annual species of *Cucurbita* cultivated in the U. S. A., there are numerous varieties showing so much diversity in characters that it is difficult at times to place these in their proper species. The writer has found that for each species the seed characters are so constant that he has constructed a key by means of which the species or any variety derived from it can readily be determined.—Helen M. Gilkey.

977. SMITH, CHARLES PIPER. Studies in the genus *Lupinus*-XI. Some new names and combinations. Bull. Torrey Bot. Club 51: 303-310. 1924.—The following new names and combinations are presented: *Lupinus Lyallii fruticulosus* (Greene), *L. aridus washoensis* (Heller), *L. aridus Torreii* (Gray), *L. aridus abortivus* (Greene), *L. aridus Cusickii* (Wats.), *L. lepidus Culbertsoni* (Greene), *L. lepidus confertus* (Kellogg), *L. laxiflorus calcaratus* (Kellogg), *L. ingoensis demissus*, *L. caudatus subtenellus*, *L. holosericeus amblyophyllus* (Robinson), *L. bingenensis dubius*, *L. oreganus Kincaidi*, *L. oreganus pusillulus*, *L. leucophyllus Belliae*, *L. leucophyllus canescens* (Howell), *L. leucophyllus tenuispicus* (A. Nels.), *L. albifrons flumineus*, *L. lapidicola* Heller n. sp., *L. sericeus flexuosus* (Lindl.), *L. ornatus obtusilobus* (Heller), *L. latifolius columbianus* (Heller), *L. latifolius canadensis*, *L. latifolius subalpinus* (Piper & Robinson), *L. Abramsi*, and *L. Cottoni*.—P. A. Munz.

978. SMITH, W. W., and W. EDGAR EVANS. *Craigia*, a new genus of Sterculiaceæ. Trans. & Proc. Bot. Soc. Edinburgh 28: 69-71. Pl. 1. 1921.—The plant described represents a monotypic genus belonging to the Sterculiaceæ, in foliage and inflorescence resembling certain species of *Sterculia*. The new generic name, *Craigia*, is in honor of William Craig. The species *Craigia yunnanensis* is also described. It is a small tree 6-10.5 m. high with deep creamy yellow flowers, and is native of Yunnan. Two localities are cited, Mekong-Salween divide, Yunnan, Lat. 26° 10' N., alt. 8000 feet, *G. Forrest*, no. 18, 409, July 1919; Shweli Valley, Yunnan, in forests, Lat. 25° N., alt. 5000 feet, *G. Forrest*, nos. 8841, 8853, July 1912.—L. R. Abrams.

979. STANDLEY, PAUL C. Eight new species of plants from Mexico. Proc. Biol. Soc. Washington. [D. C.] 37: 43-47. 1924.—*Hyperbaena ilicifolia* and *H. denticulata* are described as new and tentatively placed in the genus *Hyperbaena*. The others are: *Capparis mollicella*, *Pithecollobium caesalpinoides*, *Jatropha malacophylla*, *Malache Ortegaiana*, *Parathesis prionophylla*, and *Ruellia Conzattii*.—J. C. Gilman.

980. STANDLEY, PAUL C. New species of plants from Salvador. II. Jour. Washington [D. C.] Acad. Sci. 13: 436-443. 1923.—Notes are furnished by Agnes Chase for 2 species of grasses, under the names *Paspalum Botteri* (Fourn.) Chase, and *Syntherisma Fiebrigii* (Hack.) Chase. *Piper incanum*, a new species, is described by William Trelease. Standley describes the new genera, *Cuscatlania* and *Cashalia*; and the following new species: *Cuscatlania vulcanicola*, *Capparis stenophylla*, *Sedum salvadorensis*, *Prunus axilliana*, *Acacia Calderoni*, *Pithecollobium microstachyum*, *Apalatoa choussyana*, *Cashalia cuscatlanica*, and *Amerimnon cuscatlanicum*. The following new combinations are included: *Apalatoa acuminata* (*Crudia acuminata* Benth.), *A. antillana* (*C. antillana* Urban), *Amerimnon lineatum* (*Dalbergia lineata*

Pittier), *A. retusum* (*D. retusa* Hemsl.), *A. melanocardium* (*D. melanocardium* Pittier).—Helen M. Gilkey.

981. STANDLEY, PAUL C. New species of plants from Salvador. III. Jour. Washington [D. C.] Acad. Sci. 14: 93–99. Fig. 1. 1924.—A new genus, *Ophellantha* is described, together with the following new species: *Zamia Herrerae* Calderon & Standley, *Aeschynomene Calderoniana*, *Machaerium marginatum*, *Banisteria rosea*, *Acalypha salvadorensis*, *Croton payaquensis*, *Ophellantha spinosa*, *Triumfetta Calderoni*, and *Abutilon Calderoni*. A plant of *Zamia Herrerae* Calderon & Standley is figured.—Helen M. Gilkey.

982. STANDLEY, PAUL C. New species of plants from Salvador. IV. Jour. Washington [D. C.] Acad. Sci. 14: 238–247. 1924.—The following species are all described by Standley except as otherwise designated: *Abutilon vulcanicola*, *Hibiscus longipes*, *Malache fonsencana*, *Ayenia micrantha*, *Parsonia salvadorensis*, *Eugenia Alfaroana*, *Psidium Rensonianum*, *Jacquinia longifolia*, *Ipomoea Calderoni*, *Operculina hirsuta*, *Cordia salvadorensis*, *Citharexylum macrocarpum*, *Physalis hylophila*, *Tabebuia Calderoni*, *Aphelandra padillana*, *Justicia Soliana*, *Bowardia pallida*, *Stylosiphonia salvadorensis*, and *Verbesina salvadorensis* Blake.—Helen M. Gilkey.

983. STANDLEY, PAUL C. Nine new species of plants from Central America. Proc. Biol. Soc. Washington. [D. C.] 37: 49–53. 1924.—*Podocarpus guatemalensis*, *Coussapoa nymphaeifolia*, *C. parviceps*, *Neea stenophylla*, *Sparattanthelium guatemalense*, *Capparis quiriguensis*, *Mateta glandulifera*, *Hamelia longipes*, and *Psychotria Maxonii* are described as new.—J. C. Gilman.

984. ZENARI, SILVIA. Intorno alla sistematica di "*Sonchus oleraceus*" L. em. e di "*Sonchus asper*" Hill. [Taxonomy of *Sonchus oleraceus* L. em. and *Sonchus asper* Hill.] Nuovo Gior. Bot. Ital. N. S. 31: 5–17. 1924.—The author describes, after prolonged concordant cultural experiments, the following species of *Sonchus*, giving synonymy and herbarium notes: *S. oleraceus* L.; *S. ciliatus* Lam.; *S. lacerus* Willd.; *S. subbipinnatifidus* (Guss.) Zen. n. comb., belonging to the cycle *S. oleraceus* L. and *S. asper* (L.) Hill; *S. runcinatus* (Fiori) Zen. n. comb.; *S. spinosus* Lam.; *S. viridis* Zen.; and *S. decipiens* (DNtrs.) Zen. n. comb., belonging to the cycle *S. asper* Hill.—P. D. Caldis.

REVISIONS AND MONOGRAPHS

985. BECCARI, ODOARDO. Palme della Tribù Borasseae. [Palms of the tribe Borasseae.] Folio Fasc. II. P. 17–24. Pl. 8–15, fig. 12. Edited by UGO LINO MARTELLI. G. Passeri: Florence, 1924.—The present fascicle continues the description of *Latania Loddigesii* Mart., describes in detail the genus *Hyphaene*, presents a key to the 28 recognized species of this genus, describes *H. thebaica* Mart. and includes illustrations of *Latania Commersonii* L., *L. Verschaffeltii* Lemaire, *L. Loddigesii* Mart., *Hyphaene thebaica* Mart., and *H. nodularia* Becc.—J. M. Greenman.

986. BECCARI, ODOARDO. Palma della Tribù Borasseae. [Palms of the tribe Borasseae.] Folio Fasc. III. P. 25–32. Pl. 16–20, fig. 13–14; Fasc. IV. P. 33–40. Pl. 21–23, fig. 15. Edited by UGO LINO MARTELLI. G. Passeri: Florence, 1924.—The 3rd fascicle completes the description of *Hyphaene thebaica* Mart. and includes descriptions and illustrations of *H. nodularia* Becc., *H. macrosperma* Wendl., *H. occidentalis* Becc. (*H. thebaica* var. *occidentalis* Chev.), *H. togoensis* Dammer mss., *H. dankaliensis* Becc. vars. *subcompressa* Becc. and *haycockensis* n. var., *H. crinita* Gaertn., *H. coriacea* Gaertn., *H. mangoides* Becc., *H. benadirensis* Becc., and *H. indica* Becc. The 4th fascicle continues the treatment of *Hyphaene*, completing the description of *H. multiformis* Becc. and including descriptions and illustrations of *H. multiformis* subsp. *macrocarpa* subvar. *lindiensis*, subsp. *deformis*, *stenosperma*, *mahengensis*, *diminuta*, *rovumensis*, *intermedia*, *subglobosa*, *moshiensis*, *obesa*, *ambigua*, *compressa*, *obconica*, *nasuta*, *gibbosa*, *trigibba*, *odorata*, *kilvaensis*, *punganensis*, *semiplaena*, *morogorensis*, *tangataensis*, and *plagiosperma*; *H. Baronii* Becc.; *H. pyrifera* Becc. vars. *margaritensis*, *arenicola*, and *gosciaensis*; *H. sphaerulifera* Becc.; *H. pleuropoda* Becc.; *H. oblonga* Becc.; *H. turbinata* Wendl. with vars. *spuria* and *ansata*; *H. natalensis* Kuntze; and *H. Schatan* Bojer.—J. M. Greenman.

987. HUMBERT, HENRI. *Les Composées de Madagascar*. [The Compositae of Madagascar.] Mem. Soc. Linn. Normandie 25: 1-334. Pl. 1-6. 6 fig., distr. maps. 1923.—This important publication records the results of a comprehensive study of the Compositae of Madagascar. The author recognizes 416 species of this family in Madagascar, representing 78 genera and 8 tribes. Six of these genera and about 100 species are published as new to science. The geographical distribution of the genera and species is presented in detail; and the relationship of the Composite flora of Madagascar to that of the African continent and of other great land masses is indicated. The following new species, varieties, names, and combinations are included: *Centauroopsis Antanossi* (*Vernonia Antanossi* Scott Elliot), *C. Perrieri*, *C. Villerstii*, *C. fruticosa* Boj. var. *Baroni*, *C. cuspidata*; *Decastyllocarpus* n. gen. *Vernoniearum*, *D. Perrieri*; *Diaphractanthus* n. gen. *Vernoniearum*, *D. homolepis*; *Grangeopsis* n. gen. *Asterearum*, *G. Perrieri*; *Colobanthera* n. gen. *Asterearum*, *C. Waterlotii*; *Grangea hispida*, *G. lanata*; *Dichrocephala latifolia* DC. var. *mollis*; *Psiadiella* n. gen. *Asterearum*, *P. humilis* and var. *linearifolia*; *Conyza Alluandii*, *C. andringitrana*, *C. Perrieri*, *C. sarmentosa*, *C. Viguieri* and vars. *andringitrensis*, *boinensis*, *Cloisellii*, *latifolia* and *occidentalis*, *C. attenuata* DC. var. *hispidula*, *C. urticaefolia* (*Psiadia urticaefolia* Bak.), *C. Bakeri* (*Microglossa psiadioides* Bak.), *Psiadia leucophylla* (*Vernonia leucophylla* Bak.), *P. tsaratananensis*, *P. nigrescens*, *P. altissima* B. & H. vars. *latifolia*, *occidentalis*, *boinensis*, *Cloisellii*, *andringitrensis*, subsp. *angustifolia* var. *linearis*, subsp. *coarctata* and *serrata*; *Rochonia aspera*; *Diplostephium madagascariense*; *Brachylaena ramiflora* (*Synchodendron ramiflorum* DC.) and var. *Bernieri* (*S. Bernieri* Baill.), *B. Perrieri* (*S. Perrieri* Baill.), *B. stellulifera*, *B. Merana* (*Vernonia Merana* Bak.), *B. coriifolia* (*V. coriifolia* Bak.), *B. argentea*; *Epalles madagascariensis*; *Laggera brevipes* Oliv. & Hiern var. *salvifolia* (*Blumea salvifolia* DC.); *Pluchea tomentosa* DC. var. *transiens*, *P. Bojeri* (*Conyza Bojeri* DC.), *P. aphanantha* (*Vernonia aphanantha* Bak.), *P. Grevei* (*Psiadia Grevei* Baill.) and var. *congesta*; *Achyrocline insularis*; *Humea madagascariensis*; *Syncephalum arbutifolium* (*Astephanocarpa arbutifolia* Bak.), *S. Perrieri*, *S. candidum*, *S. suborbiculare*, *S. stenoclinoides*; *Catatia* n. gen. *Inulearum*, *C. attenuata*, *C. cordata*; *Helichrysum Danguyanum*, *H. adhaerens* Vig. & Humb. var. *leiophyllum*, *H. calocladum*, *H. Perrieri*, *H. mirabile* and var. *compactum*, *H. stilpnocephalum*, *H. deltoideum*, *H. isalense*, *H. bracteiferum* (*Stenocline bracteifera* DC.) and subsp. *tsaratananense* and *andringitranum*, *H. lanuginosum*, *H. gymnocephalum* (*Stenocline gymnocephala* DC.), *H. Geayi*, *H. dracaenifolium*, *H. sordidum*, *H. foliosum*, *H. myriocephalum*, *H. Baroni*, *H. stenoclinoides* (*Vernonia stenoclinoides* Bak.), *H. filaginoides* (*Stenocline filaginoides* DC.), *H. coarctatum*, *H. madagascariense* DC. var. *dunense*, *H. delicatum*, *H. hirtum*, *H. heterotrichum*, *H. cephalotrichum*, *H. stenocephalum*, *H. Russillonii* Hochr. var. *cuneatum*, *H. tenue*, *H. subglobosum*, *H. abietifolium*, *H. gracilifolium*, *H. Bakeri*, *H. dichroum*, *H. campanulatum*, *H. brevifolium*, *H. tomentosum*, *H. achyroclinoides* Bak. vars. *latifolium* and *auriculatum*, *H. gradatum*, *H. minutiflorum*, *H. Viguieri*, *H. empetroides*, *H. subumbellatum*, *H. Chermesonii*, *H. manopappoides*, *H. Forsythii*, *H. translucidum*, *H. attenuatum*, *H. luzulaefolium* DC. var. *brevifolium*; *Stoebe pachyclada*; *Polycline proteiformis*; *Bojeria Perrieri*; *Epallage pusilla* (*Sphacophyllum pusillum* Sp. Moore), *E. sylvatica*, *E. orbicularis*, *E. imbricata*, *E. Buchwaldi* (*Sphacophyllum Buchwaldi* O. Hoffm.), *E. dentata* DC. vars. *disciformis*, *homogoma* and *incisa*, *E. anemonifolia* DC. var. *confluens*, *E. boinensis*, *E. calva*, *E. scrophulariaefolia* (*Temnolepis scrophulariaefolia* Bak.), *E. nuda*; *Wedelia Perrieri*, *W. elongata* Vatke var. *cuneata*, *W. hirtella*; *Aspilia minima*; *Eleutheranthera madagascariensis*; *Gynura lutea*; *Notonia madagascariensis*; *Emilia Perrieri*, *E. graminea* DC. var. *latifolia*, *E. capillaris*, *E. citrina* DC. var. *angustifolia*; *Senecio andringitrensis*, *S. amplexifolius*, *S. apocynifolius* (*Vernonia apocynifolia* Bak.), *S. barorum* and var. *ellipticus*, *S. crassissimus*, *S. Decaryi*, *S. Denisii*, *S. hirtocrassus*, *S. laevis*, *S. latibracteatus*, *S. leucopappus* Boj. var. *volutus* (*Vernonia voluta* Bak.), *S. longibracteatus*, *S. myricaefolius* (*Mikania myricaefolia* Boj.), vars. *discoideus* and *Alleizettei*, *S. penicillatus* Sch. Bip. var. *glabrescens*, *S. Perrieri*, *S. riparius* DC. var. *ericifolius*, *S. sakalavorum*, *Dicoma carbonaria* (*Cloiselia carbonaria* Sp. Moore); *D. oleaefolia*, *D. Grandidieri* (*Cullumiopsis Grandidieri* Drake); *Gerbera Perrieri*, *G. diversifolia*, *G. petasitifolia*; *G. elliptica*; and *Lactuca Rogersii*.—J. M. Greenman.

988. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VII. Part 2. P. 53-80. Pl. 252-255. Alfred James Kent: Sidney, 1924.—The following new species are

described, all by the author unless otherwise indicated: *Eucalyptus Gardneri*, *E. astringens*, *E. Sargenti*, *E. Chisholmi* Maiden & Blakely, *E. Taylora* and *E. nowraensis*. Critical notes are recorded on *E. oleosa* F. v. M., *E. intermedia* R. T. Baker, and *E. Risdoni* Hook. f. var. *elata* Baker. Illustrations are given of the variety and some of the above species, and of the floral and capsular discs, as well as the fruit in vertical and transverse sections of several previously published species.—J. M. Greenman.

989. RYDBERG, P. A. The section *Tuberarium* of the genus *Solanum* in Mexico and Central America. Bull. Torrey Bot. Club 51: 145-154. 1924.—A key to 11 species is given, with discussion and treatment of the species. *Solanum Papita*, *S. Wightianum*, *S. polytrichon*, *S. Ervendbergii*, and *S. agrimonifolium* are described as new species.—P. A. Munz.

990. RYDBERG, P. A. The section *Tuberarium* of the genus *Solanum* in Mexico and Central America: Concluding paper. Bull. Torrey Bot. Club 51: 167-176. 1924.—The treatment began in the 1st paper is completed, with a key to the last 24 species. The following taxonomic changes and new names are made: *Solanum sambucinum*, *S. lanciforme* (*S. cardiophyllum* subsp. *lanceolatum* Bitter), *S. Ehrenbergii* (Bitter), *S. brachistotrichum* (Bitter), *S. nayaritense* (Bitter), *S. michoacanum* (Bitter), *S. nicaraguense*, *S. canense*, *S. subvelutinum*, *S. inscendens*.—P. A. Munz.

991. SMITH, CHARLES PIPER. Studies in the genus *Lupinus*—X. The *Micranthi* concluded. Bull. Torrey Bot. Club 51: 91-102. Fig. 92-94. 1924.—A key is given to the 7 species placed in the *Micranthi*, with diagnoses and discussion of these species. *L. micranthus Congdoni* is described as a new variety. *L. microcarpus* var. *scopulorum* n. comb. is also described, and discussion given for *L. Havardii* Wats. and *L. uncialis* Wats.—P. A. Munz.

992. STANDLEY, PAUL C. The genus *Forchammeria*. Jour. Washington [D. C.] Acad. Sci. 14: 269-272. 1924.—This genus, which was placed by Bentham and Hooker in the Euphorbiaceae, is here referred to the Cappariaceae; it is divided by the author into 2 subgenera, based on the development of the fruit. Two new species, *F. longifolia* and *F. sessilifolia* are described, and a key for all the species of the genus is given.—Helen M. Gilkey.

FLORISTICS AND PLANT DISTRIBUTION

993. ANONYMOUS. Midsummer wild flowers. Nation. Geog. Mag. 42: 35-59. 16 col. pl. 1922.—Non-technical descriptions of 38 species of American wild flowers accompany reproductions in color from sets of paintings by Mary E. Eaton of the New York Botanical Gardens.—W. M. Atwood.

994. BENNETT, ARTHUR. *Vaccinium Myrtillus* Linn., var. *pygmaeus* Ostenfeld, f. *microphylla* Lange, in litt. to Beeby. Trans. & Proc. Bot. Soc. Edinburgh 28: 75-76. 1921.—This dwarf form simulates the growth and aspect of *Salix herbacea* L. It was recorded from Saxa Vord Hill, Unst, Shetland, by the late Mr. Beeby, in the Scottish Naturalist, N. S. iii (1887), p. 27. Record is made of additional stations for this plant.—L. R. Abrams.

995. FERGUSON, WILLIAM C. Contributions to the flora of Long Island, N. Y. Second paper. Bull. Torrey Bot. Club 51: 177-201. 1924.—A list is given of the more interesting plants found by the writer over a number of years of collecting on Long Island. Notes are given on distribution and characteristics of many species.—P. A. Munz.

996. GESKE, E. J., AND W. J. SHOWALTER. Familiar grasses and their flowers. Nation. Geog. Mag. 39: 625-636. 8 col. pl. 1921.—A popular account of some of the characteristics of the grass family is given. The flowers of a few common grasses are described and shown greatly magnified in colored plates.—W. M. Atwood.

997. GRANDE, L. Note di floristica. [Floristic notes.] Nuovo Gior. Bot. Ital. 27: 223-243. 1920.—In continuation of his studies on the flora of Italy, the author records critical notes on upwards of 50 species and varieties of flowering plants. *Teucrium Polium* L. var. *japygicum* is described as a new variety from the province of Lecce. *Scorzonera neapolitana* is given as a new name for *S. trachysperma* Guss. The following new combinations with name-carrying synonym in parenthesis are included: *Cnidium sylvestre* (*Selinum sylvestre* L.), *Hirschfeldia virgata* (*Sinapis virgata* J. & C. Presl), *Ophrys rosea* (*O. insectifera* L. var. *rosea* Desf.), *Cymodocea major* (*Phucagrostis major* Cavol.), and *Elichrysum angustissimum* (*Gnaphalium angustissimum* Mill.).—J. M. Greenman.

998. GUILLAUMIN, A. Contribution à la flore de la Nouvelle-Calédonie. [Contribution to the flora of New Caledonia.] Bull. Mus. Hist. Nat. [Paris] 27: 257-259. 1921.—The author gives a list of 53 recognizable forms of phanerogams contained in a collection of seed received from New Caledonia.—*John M. Fogg, Jr.*

999. JOHNSTON, H. H. Additions to the flora of Orkney, as recorded in Watson's Topographical Botany, second edition. Trans. & Proc. Bot. Soc. Edinburgh 28: 51-66. 1921.—This paper forms a continuation of 3 papers on the same subject. Forty-nine species are recorded, 8 of which are cryptogams, 7 monocotyledons, and 34 dicotyledons.—*L. R. Abrams.*

1000. KENOYER, L. A. Distribution of the Ericales in Michigan. Papers Michigan Acad. Sci. Arts and Letters 3: 166-191. 1924.—The order Ericales contains 39 known species in Michigan, of which only 1 is introduced, namely, *Calluna vulgaris*, which has become naturalized to a limited extent in the Upper Peninsula. Of the 38 native species, 22 are northern and 13 eastern in their further distribution. Ten are confined to bogs, while 9 others frequently grow there; and 10 are found prevailing in subclimax forests. On Isle Royale 3 species occur in the "northern birch-fir-spruce climax forest. This accords with the general rule that climax members in the north tend to be pushed away from the climax as one proceeds southward." Four families are recognized, Pyrolaceae with 10 species, Monotropaceae with 3 species, Ericaceae with 10 species and Vacciniaceae with 16 species. The families, genera, and species are all distinguished by keys. No species descriptions are given. Their distribution is given by counties under 2 subdivisions: (1) Those the actual specimens of which were seen by the author, and (2) those where only reports without specimens were available.—*Ernst A. Bessey.*

1001. KENOYER, L. A. Distribution of the Umbellales in Michigan. Papers Michigan Acad. Sci. Arts and Letters 3: 131-165. 1924.—Fifty-nine species of Umbellales are known to occur in Michigan, divided as follows: Araliaceae, 8, including 1 introduced from the South; Ammiaceae, 29 native and 13 Eurasian species; and Cornaceae, 10 native species. The native species are predominantly eastern ones, with northern ones following in importance. One western species, *Echinopanax horridum*, occurring on Isle Royale, is not known elsewhere east of the Rocky Mountains. Fourteen species are found, mainly in swamps and bogs, 16 mainly in pioneer or subclimax forests, 13 mainly in climax forests, while 2 belong to the prairies. The families are distinguished by a key and under each family the genera are keyed and likewise the species in each genus. Under each species are given the Latin and English names and general distribution, followed by lists of counties from which specimens have been examined, and from which the species has been reported only. The genera of the Ammiaceae are set apart in 2 keys, the one based on fruit characters, the other on leaf and flower characters.—*Ernst A. Bessey.*

1002. KOORDERS, S. H. Exkursionsflora von Java umfassend die Blütenpflanzen. [Excursion-flora of Java comprising the flowering plants.] Roy. 8vo. Vol. IV. Atlas. 2 Abteilung. P. 83-167. Fig. 191-355. 1922; 3 Abteilung P. 169-345. Fig. 356-591. 1923. Gustav Fischer, Jena.—These 2 parts are edited by A. KOORDERS-SCHUMACHER and continue on the same plan as the 1st part of this volume which appeared in 1913, namely, with illustrations only, portraying the species described in previously published volumes of this work. The 2nd part includes illustrations of the Cyperaceae and Palmae, and the 3rd part embraces the families Carludoviciaceae to Burmanniaceae.—*J. M. Greenman.*

1003. KOORDERS, S. H. Supplement op het Eerste Overzicht der Flora van N. O. Celebes tevens verslag eener botanische dienstreis door de Minahasa (Enumeratio specierum phanerogamarum Minahasae. Suppl.). [Supplement to the first conspectus of the flora of N. E. Celebes.] Roy. 8vo. Deel II. P. 1-9. Pl. 1-127; Deel III. P. 1-60. Visser & Co.: Batavia, 1922.—These 2 parts are edited by A. KOORDERS-SCHUMACHER. The 2nd part consists of a list of 127 species of flowering plants and illustrations of each species. The 3rd part presents an enumeration of the same species giving explanations of plates, bibliography, descriptive notes, habitat, and citation of exsiccatae. [See also Bot. Absts. 12, Entry 6073.]—*J. M. Greenman.*

1004. MAIDEN, J. H. The forest flora of New South Wales. Vol. VIII. Part 6. P. 71-80. Pl. 288-291. Alfred James Kent: Sydney, 1924.—*Pisonia Brunoniana* Endl., *Eucalyptus*

Blaxlandi Maiden & Cambage, *Tabernaemontana orientalis* R. Br. var. *angustisepala* Benth., and *Arytera distylis* Radlkofer are described and illustrated.—*W. N. Sparhawk.*

1005. PARLIN, JOHN C. Field Notes for 1922. Maine Naturalist 3: 25-28. 1923.—Lichens, bryophytes and vascular plants are included.—*C. A. Weatherby.*

1006. RYTZ, W. *Veronica filiformis* Smith (nec. DC.) ein Neubürger unserer Flora. [*Veronica filiformis* Smith, not DC., new to our flora.] (Abstract) Mitteil. Naturf. Ges. Bern 1923: LVI. 1924.—*Veronica filiformis* Smith, which comes from the Caucasus, up to the present time has been observed in Europe only at the mouth of the Rhone. The author has found this species in the region of Bern, where it was introduced with grass seed.—*S. Blumer.*

1007. SMALL, JOHN K. *Onobrychis onobrychis* (L.) Rydb. in the Eastern United States. *Torrey* 24: 48-49. 1924.—This Eurasian plant was collected at Fort Howard, Wisconsin, in 1882. It has since become an important fodder-plant in the Rocky Mountain region. Wild plants were collected at Gowanda, New York, in 1922.—*J. C. Nelson.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

SAM F. TRELEASE, *Editor*

1008. ANONYMOUS. A temple of science. Dedication of a national building at Washington. *Nature* 113: 940-943. 2 fig. 1924.—A brief description and illustration of the exterior of the new building of the National Academy of Sciences and the National Research Council (U. S. A.) are given, together with extracts from the dedication speeches.—*O. A. Stevens.*

1009. ANONYMOUS. Proceedings of the second annual meeting of the Indian Botanical Society. *Jour. Indian Bot. Soc.* 3: 252-266. 1923.—This includes the presidential address *in extenso* [See this issue, Entry 160] and summaries of 19 papers read at Lucknow in January, 1923.—*Winfield Dudgeon.*

1010. B., F. T. Imperial botanical conference, 1924. *New Phytol.* 22: 149. 1923.

1011. CHOUX, P. Revue des travaux de botanique tropicale et subtropicale (1910-1919.) [Review of the work in tropical and subtropical botany, 1910-1919.] *Rev. Gén. Bot.* 36: 31-47, 85-96, 123-144, 182-191, 213-219. 1924.

1012. DUDGEON, W[INFIELD]. The botanical opportunity in India. *Proc. Asiatic Soc. Bengal, N. S.* 18: 95-115. 1922 [1923].—This is the presidential address before the joint meeting of the Bot. Sect. of the Indian Sci. Congr. and the Indian Bot. Soc., Madras, February, 1922. The author takes stock of botanical achievement in India, and suggests lines of investigation that seem most urgent and most likely to be fruitful.—*Author.*

1013. DUNN, MARIN S. The microloop. A rapid method for isolating single spores. *Phytopathology* 14: 338-340. 1 fig. 1924.—A microloop made by bending a glass filament was found useful in isolating a single spore from spore dilutions.—*Adeline Ames.*

1014. GIDDINGS, N. J. A laboratory convenience. *Phytopathology* 14: 342. 1924.—A description is given of a test tube filler which prevents the culture medium from getting on the sides of the tube. The apparatus is made by Eimer and Amend.—*Adeline Ames.*

1015. HALE, F. E. Keeping our water fit to drink. *Sci. Amer.* 129: 332, 375-376. 5 fig. 1923.—This concerns the microscopic plant and animal forms of our reservoirs and the means used to keep them under control.—*Chas. H. Otis.*

1016. INDIAN SCIENCE CONGRESS, CALCUTTA. [Summaries of papers.] *Jour. & Proc. Asiatic Soc. Bengal, N. S.* 17: 175-187. 1921 [1922].—Summaries are given of 21 papers read before the Bot. Sect. of the Indian Sci. Congr., Calcutta, in February, 1921.—*Winfield Dudgeon.*

1017. INDIAN SCIENCE CONGRESS, MADRAS. [Summaries of papers.] *Jour. & Proc. Asiatic Soc. Bengal, N. S.* 18: 115-124. 1922 [1923].—Summaries are given of 25 papers read before the Bot. Sect. of the Indian Sci. Congr., Madras, in February, 1922.—*Winfield Dudgeon.*

1018. LONGLEY, W. H. Observations on submarine color photography, etc. *Carnegie Inst. Washington Year Book* 22: 159-163. 1924.—This branch of photography may be undertaken successfully in shallow water of clear tropical seas, an exposure of 10-12 seconds being required.—*B. E. Livingston.*

1019. MESTREZAT, W., ET M. JANET. Nouveau dispositif pour la regulation des thermostats. [New arrangement for regulation of gas thermostats.] *Bull. Soc. Chim. Biol.* 6: 534-

535. 1 fig. 1924.—The ordinary mercury thermostat for gas control is modified by reversing the course of the gas through it and making the sloping tip of the outlet tube dip slightly beneath the surface of the mercury. The gas is thus forced to pass between the mercury and the wall of the inner tube. The surface of the mercury is protected by a drop of bromide or chlorine water.—*Joseph S. Caldwell.*

1020. MICHEL, AUGUSTE. Eclairage au microscope par un système simple et avantageux de petites lampes électriques. [A simple system of microscope illumination by means of small electric lamps.] *Compt. Rend. Soc. Biol.* 90: 1000-1002. 1924.

1021. MURRAY, WALTER. Device for gas-heated thermostats. *Jour. Chem. Soc. [London]* 125: 461-462. 1 fig. 1924.

1022. PACK, DEAN A. Permanent spirals for tags. *Phytopathology* 14: 398-400. 3 fig. 1924.—A metal tag used in marking beets is described. Attached to it is a spiral of galvanized wire which can be screwed into a fleshy plant part and is not easily removed.—*Adeline Ames.*

1023. REED, GUILFORD B. A binocular microscope arranged for the study of colonies of bacteria. *Jour. Bact.* 7: 123-125. 1922.—The author describes a method for isolating minute bacterial colonies, such as those of *Hemophilus (Bacterium) influenzae*, or for dividing colonies for staining as well as isolation.—*C. E. Skinner.*

1024. SCHINZ, HANS. Der Botanische Garten und das Botanische Museum der Universität Zurich in den Jahren 1922 und 1923. [Botanical Garden and Museum, University of Zurich.] *Mitteil. Bot. Mus. Univ. Zurich* 104. 1-28. 1924

1025. SLATER, A. W. The preparation and reproduction of scientific illustrations. (Reprint from Proc. 3rd Entomological meeting, Pusa.) *Agric. Res. Inst., Pusa Bull.* 114. P. 1043-1048. Pl. 178-179. 1921.—The author briefly discusses line engravings, the half tone process, 3-color engravings, photozincography, wood cuts, and photogravure; and gives hints on the making of originals.—*Frederick V. Rand.*

